AMERICAN EMBASSY
ANKARA, TURKEY

STU150-05-M-00218

STRUCTURAL REPAIR OF MOTOR POOL BUILDING'S WAREHOUSE AND AUTO REPAIR SHOP

SPECIFICATIONS

TMA mühendislik ltd.

SECTION

SECTION 01010 - SUMMARY OF THE WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contract Drawings and General Provisions of the contract. including the Contract Clauses arid Conditions and other Division 1 Specification sections, apply to the work of this section.

1.2 PROJECT NAME. STRUCTURAL REPAIR OF MOTOR POOL BUILDING'S WAREHOUSE AND AUTO REPAIR SHOP, U.S. EMBASSY, ANKARA, TURKEY

1.3 PROJECT DEFINITION

A. Structural repair of Motor Pool Building's Warehouse and Auto Repair Shop as detailed on the contract drawings.

1.4 CONTRACTOR'S USE OF THE PREMISES

A. The facility itself is occupied and fully functioning as the U.S. Embassy. The Contractor shall have access only to those portions of the facility directly affected by the work. At all times, work must be scheduled with and coordinated through the Project Director to insure that the operation of the Consulate is not adversely affected.

B. Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to Post regulations affecting the work site while engaged in project construction.

1.5 COORDINATION

A. The work of this Contract, besides the actual construction, includes coordination of the entire work of the project, including preparation of general and detailed coordination drawings, diagrams and schedules, materials management and control of site utilization, from beginning of construction activity through project completion.

END OF SECTION 01010

SECTION 01020 - CONTRACTOR'S USE OF THE PREMISES

PART 1 -GENERAL

1.1 A governing requirement of this contract is that, throughout the period of contract implementation, the Post must be able to carry out its regular functions and make normal daily use of premises and facilities, allowing only such adjustments as are strictly necessary for the accommodation of the ongoing construction. Individual work areas will be will be vacated by the Post in accordance with the Construction Project Phasing Plan, vacancy schedule and the approved construction schedule. The relocations of the Post personnel and resources will be performed by the Post and coordinated by the Project Director with the Post prior to authorizing the Contractor to proceed with that segment of the work.

1.2 The Contractor shall have use of the site and must coordinate his use with the needs of other concurrent projects, if any, as well as ongoing Post functions.

1.3 The Contractor shall use only the designated entrances, routes, stairs and windows to move his men, materials and equipment.

1.3.1 The facilities used by the Contractor shall be restored to the quality of original condition as a minimum as determined by the Project Director. It shall be the Contractor's responsibility to establish the conditions of the facilities before using them. Any photographs taken in this regard shall be subject to Post and the U.S. Department of State (DOS) Bureau of Diplomatic Security (DS) rules, regulations and requirements (see 1.9).

1.3.2 Prior to starting any work, the contractor will establish a "punch list" showing all existing damages and defects to existing finishes which are beyond the scope of this project. This list will be reviewed in a joint inspection with the Project Director.

1.4 The Contractor shall remove, protect, store and return or replace to their original condition and location any items removed or disturbed by the Contractor's actions. The streets and sidewalks enclosed or damaged shall be restored to the quality of their original condition as a minimum as determined by the Project Director.

1.5 Stacking or storing of furniture or other materials and equipment in hallways and passageways posing safety hazards or causing restrictions or constrictions to traffic flow or easy movement of the Post or the Contractor personnel, tools or equipment, shall not be permitted. Post will move furniture.

1.6 The Contractor shall advise the Project Director in writing fifteen days in advance of the need regarding any area of the project that the Contractor wants vacated.

1.7 Prior to site move in, the Contractor shall submit and obtain Project Director's approval to a contractor's site facility, parking, utilities and the staging and storage plan. The plan shall be based on a general area designation plan provided by the US Government.

1.8 Safe and free access from and to all site stair exits and other regular, fire or emergency exits shall be maintained at all times.

1.9 The entire Post facility is designated as classified. Photographs of any part or facility of the Post shall not be taken without the prior written approval of the RSO. The exposed film or camera loaded with film having one or more exposures shall be locked in a secure cabinet. Upon completion, the film processing shall be at the direction of the Project Director in consultation with the RSO. The Post location shall not be identified on the roll of film or any of the exposed frames of film in any shape or form.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01020.

SECTION 01030 - CONTRACTOR'S WORKING PRACTICE

PART 1 - GENERAL

1.1 Contractor's Workweek:

1.1.1 The workweek shall not exceed six ten-hour workdays per week without prior approval of the Project Director.

1.1.2 The workweek may include Saturdays and Sundays on a regular basis unless directed otherwise by the Project Director.

1.1.3 Subject to the provisions of Section 01040 – "Contractor's Working Practices", and with prior approval of the Project Director, it will be permissible for the Contractor to include the nighttime hours in his workweek schedule. 2001 Embassy Holiday schedule is attached for Contractor's information. 2002 will be similar, but religious holidays vary in date.

1.1.4 Under unusual or exceptional circumstances or in cases of emergencies, upon written request from the Contractor justifying such an action, the Project Director may exercise discretion to waive, to the extent feasible or practical, and subject to convenience, commitments, work load or schedule of the Post, in part or in full, some of the requirements of this Section, for durations or periods of time deemed appropriate by the Project Director. Such waiver shall be in writing by the Project Director.

1.2 Post's character as a functional and operational unit:

1.2.1 The Post shall remain fully and completely functional and operational at all times during the duration of this contract. The Contractor shall plan, implement and execute his activities in a way not to obstruct the normal full scale functions and operations of the Post. The use or access to the building or Post shall not be restricted or obstructed except as authorized by the Project Director, or provided in the Project construction phasing plan and the approved construction schedule.

1.2.2 Uninterrupted supply of all utilities and facilities shall be maintained by the Contractor at all times at Post. Any unavoidable interruption or disruption of a utility or a facility shall be with the prior written approval of the Project Director who shall be notified in writing by the Contractor not less than fourteen (14) days prior to the proposed interruption or disruption. The interruptions or disruptions shall be selectively phased, scheduled at approved times, be of approved durations and shall affect only the approved segments of work in a way to cause minimum impact or inconvenience to the Post. Complete outage of the electric power supply of the entire Post or building, or blanket power outage of a major segment of a section of the Post or building shall not be permitted.

1.2.2.1 Notwithstanding the above, power outages may be scheduled 14 days in advance to occur on weekends and holidays, and/or after normal operating hours.

1.2.3 Noise Control: Since Post is to remain fully functional and operational during the duration of the contract, the Contractor's noise producing operations which, in the opinion of the Project Director, distract or disturb the Post personnel to an unacceptable degree, shall be restricted or reduced to a level deemed acceptable by the Project Director or scheduled at a time of day specified by the Project Director

1.2.4 Dust Control: The Contractor shall be responsible to put into effect and implement an approved dust control program. .

1.2.4.1 The Contractor's trash chute shall be enclosed, and the container it empties into shall be fitted with a cover to minimize dust originating at the container. Water sprinkling of the debris and the container shall be provided during demolition. The Contractor shall take the necessary steps to minimize dust infiltration into the Post and the neighboring buildings, especially during the warm parts of the year when windows are kept open.

1.3 Irrespective of. the size of the room or the size of the patch work in the room, any room or area impacted by the Contractor's action shall be painted in its entirety as directed by the Project Director. All exposed areas of the exterior walls affected by the construction under the terms of this contract or the Contractor's action shall be repaired and restored to a condition to blend with the adjacent areas to the satisfaction of the Project Director.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION – 01030.

SECTION 01060 - MATERIALS HANDLING, SHIPPING AND STORAGE

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

1.1.1 This section addresses handling, shipping, storage, staging the Contractor's furnished (CFM) materials.

1.2 MATERIALS STORAGE

1.2.1 It will be to the Contractor's advantage to plan the deliveries of materials with care and precision to reduce the amount of materials needing storage, the storage time, and the equipment on site.

1.2.2 The safekeeping, safeguarding and weather protection of the material at the site storage and staging areas shall be the Contractor's responsibility.

1.2.3 Payments for the materials stored in an approved storage area at Post will be admissible at the invoice value of the cost of materials alone, on production of the suppliers invoices.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION – 01060.

SECTION 01070 - PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract Drawings and general provisions of the Contract, including the Contract Clauses and Conditions, the Supplementary Clauses and Conditions and other Division 1 Specification Sections.

1.2 DESCRIPTION OF WORK:

1.2.1 The Contractor shall staff the Project with personnel of sufficient quantity and possessing adequate qualifications to administer and supervise all work required under this Contract. The Contractor shall, as a part of this administrative responsibility, provide staff a part of whose duties it shall be to prepare estimates, make detailed proposals and fully administer Change Orders and Modifications as may be issued pursuant to this Contract.

1.3 PROJECT COORDINATION

1.3.1 The work of this Contract includes coordination of the entire work of the project, including preparation of general and detailed coordination drawings, diagrams and schedules, and control of site utilization, from beginning of construction activity through project closeout.

1.3.2 Prior to beginning any work activity the Contractor shall, provide the Project Director with complete information about the activity and how that activity complies with the requirements of Sections 01531 Safety Program and 01540 Security Regulations.

1.3.3 The Contractor shall coordinate the physical locations and the space and alignment requirements of the mechanical, electrical and utility installations to be performed by various trades, specialized teams of user groups, and the Contractor.

1.4 COORDINATION AND MEETINGS:

1.4.1 General: Prepare written records of all meetings between the Contractor and the PD and submit them to the PD within a 24 hour period after the meeting for his review and approval.

1.4.2 Coordination Drawings: Prepare coordination drawings where work by separate entities requires fabrication off site of products and materials which must be accurately interfaced. Coordination drawings shall indicate how work shown by separate shop drawings will interface and shall indicate sequence for installation. Comply with all requirements of the “Submittals” sections.

1.4.3 Coordination Meetings: Hold weekly project coordination meetings at scheduled times on site convenient for all parties involved. Minutes of meetings shall be distributed in accordance with Project Director’s instructions within two days.

1.5 SURVEYS, RECORD AND REPORTS:

1.5.1 General: Working from lines and levels established by the drawings, establish and maintain bench marks and other dependable markers. Establish bench marks and markers to set lines and levels for work as needed to properly locate each element of the project. Calculate and measure required dimensions as shown within recognized tolerances. Drawings shall not be scaled to determine dimensions. Advise the Project Director and all entities performing work of marked lines and levels provided for their use.

1.5.2 Survey Procedures: Before proceeding with the layout of actual work, verify the layout information shown on the drawings, in relation to the property survey and existing bench marks or buildings. As work proceeds, check every major element for line, level and plumb. Maintain a surveyor's log or record book of such checks; make this log or record book available for the Project Director's reference. Record deviations from required lines and levels and advise the Project Director promptly upon detection of deviations that exceed indicated or recognized tolerances. Record deviations which are accepted,, and not corrected, on record drawings. Provide the Project Director a plan showing all horizontal and vertical survey controls used to layout the building, site work and utilities.

2.0 CLEANING AND PROTECTION:

2.1 General: During handling and installation of work at the project site, clean and protect work in progress and adjoining work on the basis of continuous maintenance. Apply protective covering on installed work where it is required to ensure freedom from damage or deterioration at time of substantial completion. Clean and perform maintenance on installed work as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

2.2 Limiting Exposures of Work: To the extent possible through reasonable control and protection methods, supervise performance of the work in such a manner and by such means as will ensure that none of the work, whether completed or in progress, will be subjected to damage during the construction period.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION – 01070.

SECTION 01071 - FIELD ENGINEERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract drawings and general provisions of the Contract, including the Contract Clauses and Conditions, the Supplementary Clauses and Conditions and other Division 1 Specification Sections.

1.2 SUMMARY

1.2.1 General: This Section specifies administrative and procedural requirements for field engineering services, including, but not necessarily limited to, the following:

1.3 SUBMITTALS

1.3.1 A. Certificates: Submit a certificate signed by the Land Surveyor or Professional Engineer certifying that the location and elevation of improvements comply with the Contract Documents.

B. Site Location Survey for New Gate Houses Submit original mylar survey drawing plus six (6) printed copies.

C. Final Property Survey: Submit original myular and six (6) copies of the final property survey.

D. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of Sections “Submittals” and “Project Closeout”.

1.4 QUALITY ASSURANCE

1.4.1 Surveyor: Engage a Registered Land Surveyor registered in the country where the project is located, to perform land surveying services required.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

3.1.1 The Contractor will identify existing control points and property line cornet stakes.

3.1.2 Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks before proceeding to layout the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.

Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points, or requirements to relocate reference points because of necessary changes in grades or locations.

Promptly replace lost or destroyed project control points. Base replacements on the original survey control points.

3.1.3 Establish and maintain a minimum of two permanent benchmarks on the site, referenced to data established by survey control points.

Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

3.1.4 Existing utilities and equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.

Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping.

3.2 PERFORMANCE

3.2.1 Gate House Numbers 2, 3, and 4:

A. The Contractor shall establish the precise location of the new Gate House on its respective site location using the dimensions shown on drawing C02. The Contractor shall submit his proposed locations from existing permanent benchmarks or monuments or new monuments set by the Contractor and located dimensionally from an existing benchmark or monument. The true and magnetic north shall be indicated on the proposed site plan along with the directional bearing of the property line paralleling Ataturk Boulevard. The site plan shall also contain existing and projected grade elevations and proposed location of all new exterior utilities. This plan shall be submitted in original mylar format plus six (6) printed copies for the approval of the Project Director. No site work will be permitted prior to approval of this proposed site plan by the Project Director.

B. The Contractor shall also show on the survey the following information:

1. Property lines, easements, elevations and on-site information needed to properly lay out lines and levels.

2. Location of existing established survey reference points and bench marks, whether on or off the site.

3. Location of proposed building(s) and site improvements.

4. Location of existing utilities and other existing site improvements.

3.2.2 Working from lines and levels established by the property survey, establish benchmarks and markers to set lines arid levels at each story of construction and elsewhere as needed to properly locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.

A. Advise entities engaged in construction activities, of marked lines and levels provided for their use.

B. As construction proceeds, check every major element for line, level and plumb.

3.2.3 Surveyor's Log: Maintain a surveyor's log of control and other survey work. Make this log available for reference.

A. Record deviations from required lines and levels, and advise the Project Director when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.

B. On completion of foundation walls, major site improvements, and other Work requiring field engineering services, prepare a certified survey showing dimensions, locations, angles and elevations of construction and sitework.

3.2.4 Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.

3.2.5 Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels and control lines and levels required for mechanical and electrical, work.

3.2.6 Existing Utilities: Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by construction. Coordinate with local authorities having jurisdiction.

3.2.7 Final Property Survey: Before Substantial Completion, prepare a final property survey showing significant features (real property) for the Project. Include on the survey a certification, signed by the Surveyor, to the effect that principal metes, bounds, lines and levels of the Project are accurately positioned as shown on the survey.

A. Recording: At Substantial Completion, have the final property survey recorded by or with local governing authorities as the official "property survey" only if required by host country authorities. If not required by host country authorities, the Contractor shall advise the Project Director of such in writing at the time of Substantial Completion.

END OF SECTION – 01071.

SECTION 01100 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract drawings and general provisions of the Contract, including the Contract Clauses and Conditions, the Supplementary Clauses and Conditions and other Division 1 Specification Sections.

1.2 DEFINITIONS

1.2.1 General Explanation: A Substantial amount of specification language consists of definitions of terms found in other Contract Documents, including the Contract Drawings. (Drawings are recognized as being diagrammatic in nature and not completely descriptive of the requirements indicated thereon). Certain terms used in Contract Documents are defined in this article. Definitions and explanations contained in this section are not necessarily either complete or exclusive, but are general for the Work to the extent that they are not stated more explicitly in another element of the Contract Documents.

1.2.2 Regulations: They are defined to include laws, statutes, ordinances and lawful orders issued by governing authorities, as well as those rules, conventions and agreements within the construction industry which effectively control the performance of the work regardless of whether they are lawfully imposed by a governing authority or not.

1.2.3 Indicated: The term “indicated” is a cross-reference to graphic representations, notes or schedules on the drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in the Contract Documents. Where terms such as “shown”, “noted”, “scheduled”, and “specified” are used in lieu of “indicated”, it is for the purpose of helping the reader locate the cross-reference, and no limitation of location is intended except as specifically noted.

1.2.4 Approve: Where used in conjunction with the Project Director’s response to submittals, requests, applications, inquiries, reports and claims by the Contractor, the meaning of the term “approved” will be held to limitations of the responsibilities and duties as specified in Contract Clauses and Conditions. In no case will the Project Director’s approval be interpreted as a release of the Contractor from responsibilities to fulfill requirements of contract documents.

1.2.5 Project Site: The term “project site” is defined as the space available to the Contractor for performance of the Work, either exclusively or in conjunction with others performing other work as part of the project. The extent of the project site may or may not be identical with the description of the land upon which the project is to be implemented. In the course of project implementation, the project site may vary, depending on the parts of building and courtyard where the principal construction activity is concentrated at a given period.

1.2.6 Furnish: Except as otherwise defined in greater detail, the term “furnish” is used to mean “supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations,” as applicable in each instance.

1.2.7 Install: Except as otherwise defined in greater detail, the term “install” is used to describe operations at project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

1.2.8 Installer: The term “installer” is defined as “the entity” (person or firm) engaged by the Contractor, its subcontractor or sub-subcontractor for performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. it is a requirement that installers are experienced in the operations they are engaged to perform. -

1.2.9 Testing -Laboratory: the term “testing laboratory” is defined as an entity, independent of the Contractor’s organization, engaged to perform specific inspections or tests of the work, either at the project site or elsewhere, and to report, and (if required) interpret results of those inspections or tests.

1.3 INDUSTRY STANDARDS

1.3.1 Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of the Contract Documents.

1.3.2 Conflicting Requirements: Where compliance with two or more standards is specified, and where these standards establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the contract documents specifically indicate a less stringent requirement. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the PD for a decision before proceeding. Where Contract Documents conflict with reference standards, the Contract Documents shall govern. .

1.3.3 Minimum Quantities or Quality Levels: In every instance the quantity or quality level shown or specified is intended to be the minimum for the work to be provided or performed. Unless otherwise indicated, the actual work may either comply exactly, within specified tolerances, with the minimum quantity or quality specified, or may exceed the minimum within reasonable limits. In complying with these requirements, the indicated numeric values are either minimum or maximum values, as noted, or as appropriate for the context of the requirements. Refer instances of uncertainty to the Project Director for clarification before proceeding.

1.3.4 Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where acronyms or abbreviations are used in the specifications or other Contract Documents they are defined to mean the recognized name of the trade association, standards generating organization, governing authority or other entity applicable to the context of the text provision.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION – 01100.

SECTION 01105 – CONSTRUCTION SECURITY

PART 1 - GENERAL

1.01 PURPOSE.

The security requirements set forth in this Section represent the minimum acceptable security standards for this contract. The security requirements set forth in this Section are intended to supplement the contract, other Specifications and other security standards applicable to the Contractor including the Department of Defense (DOD) Industrial Security Manual for Safeguarding Classified Information (!SM). Nothing in this Section is intended to supersede the contract, other Specifications or other security standards applicable to the Contractor.

Any questions about the purpose and scope of this Section or any perceived conflicts between this Section and other contract documents and security standards should be immediately brought to the attention of the Office of Foreign Buildings Operations Project Director (FBO PD).

1.02 SECURITY VIOLATIONS.

Any violation or failure to fulfill the requirements of this Section by the Contractor, may result in:

1. Immediate suspension and removal from the Final Construction Site, Support Sites, and Secure Storage Area(s) (SSA) of individuals suspected to be involved in any violation of project security Specifications;

2. Termination and permanent removal from the Final Construction Site, Support Sites, and SSA of individuals determined to be involved in any violation of project security Specifications;

3. Termination of Subcontractors determined to be involved in any violation of the security Specifications of this Section;

4. Termination of the contract;

5. Suspension or loss of corporate and/or individuals security clearances;

6. Suspension or debarment of Contractor and/or individual Contractor Personnel~ and/or

7. Civil or criminal prosecution of corporate and/or individual violators. -

1.03 COSTS ASSOCIATED WITH SECURITY VIOLATIONS.

If it is determined that the Contractor has violated a security Specification of this Section, the Contractor will be responsible for:

1. All costs associated with the removal and replacement of terminated Contractor Personnel;

2. All costs associated with reordering and shipping of materials or equipment;

3. All costs associated with the removal and replacement of work affected by the violation; and

4. Additional U.S. Government inspection, personnel and material costs resulting from the violation. .

1.04 DEFINITIONS AND TERMS.

CONTROLLED ACCESS AREA (CAA)	Areas within a building where classified information wilt be handled, stored, discussed, or processed. in this specific project, the area of the Chancery immediately below the Ambassador's office is presently occupied by MSG Post 2, which will be demolished and the area renovated. Although the area beneath the Ambassador's office is not CAA, limited surveillance will be necessary when local workmen perform finish work on the ceiling, due to the physical proximity to the Ambassador's office.
CENTRAL RECEIV1NG/ CONSOLIDATION POINT (CRP)	A warehouse, or other Contractor obtained facility in the U.S., where the Contractor receives ISS Material from the vendors, consolidated ISS Material, and prepares and packs ISS Material for onward secure transportation to the Final Construction Site. All ISS Material which must be procured in the U.S. per this specification will be consolidated through the CRP. This CRP must be certified as a secure warehouse by the U.S. Government. For this project, the CRP wilt be either State Annex (SA) 4-cr SA-21.
CLEARED U.S. CITIZEN	A U.S. Citizen possessing a current validated security clearance (minimum SECRET) as required by the Department of Defense (DOD) Form 254 contract document and authorized by the FBO PD to be at the Final Construction Site, a Support Site, or a SSA.
CONTRACTOR/ CONTRACTOR PERSONNEL	In addition to the general construction contractor, these terms include all employees, consultants, subcontractors and suppliers to the general construction contractor for the purposes of this Section.
CONTROLLED	Controlled is the state of being directly protected by the 24-hour presence of Cleared U.S. Citizen personnel or being under the protection of properly installed technical devices approved by the U.S. Government.
CONTROLLED ACCESS AREA (CAA)	Areas within a building where classified information will be handled, stored, discussed, or processed. For the purpose of this project, no work will take place within the CAA.
DESIGNATED COUNTRIES	Nations identified as such by the DOD Industrial Security Manual [ISM] for Safeguarding Classified Information (DOD 5220.22 M).
FBO PROJECT DIRECTOR (FBO PD)	The Contracting Officer's Representative (COR) on all matters pertaining to the project. The FBO PD is responsible for ensuring that all construction activities are accomplished in a manner that complies fully with applicable statutes and security regulations. The FBO PD acts as the interface between U.S. Government security personnel and the Contractor.

FINAL CONSTRUCTION SITE	**The Motor Pool Building, U.S. Embassy, Ankara, Turkey – the subject of this contract.**
FINISH WORK	All work other than General Construction Work (See below).
GENERAL CONSTRUCTION WORK	The erection of the structural shell of the building, including the installation of major utilities and feeder lines, and including all materials which are component parts of structural elements. This does not include subsequent work which attaches or places material on or through structural elements.
INTEGRATED SECURITY SYSTEMS (ISS)	Components of security systems which, although unclassified, are considered sensitive and must be procured, shipped and stored under secure conditions.
RAW MATERIALS	Unfinished materials, especially uprocessed natural products used in manufacture or assembly. Examples include water, cement, sand, and aggregate.
SECURE STORAGE AREA(SSA)	A specific enclosed area, or a Container within a secure perimeter, in which ISS Materials are stored to protect their security integrity. Access to this area will be Controlled by the U.S. Government.
VISITOR	Personnel seeking access to a Final Construction Site, Support Site or SSA who do not have a processed and approved Optional Form 174, or similar approved form, on file with the FBO PD.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.01 U.S. GOVERNMENT ACCESS.

The Office of Foreign Buildings Project Director (FBO PD), and other Cleared U.S. Citizens authorized by the FBO PD, wilt be afforded complete and unrestricted access at any time to all portions of the **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project** Final Construction Site, any Support Sites and SSAs.

Support Sites will not be used for the fabrication or assembly of materials or items intended to be permanently installed at the Final Construction Site without the prior approval of the FBO PD.

3.02 CONTRACTOR COMPLIANCE WITH **US Embassy-ANKARA** POLICIES.

Contractor Personnel will be required to adhere to all policies, regulations and procedures promulgated by the **US Embassy - Ankara** regarding conduct, behavior, and security, matters.

3.03 NON-FRATERNIZATION POLICY.

All Cleared U.S. Citizen Contractor Personnel will comply with DOS (89 State ALDAC 330541 and Change 1, 91 State 232998 - CONFIDENTIAL) and **US Embassy - Ankara** policies regarding non-fraternization and contact reporting. These policies (Paragraphs 3.02 and 3.03) are available to Contractors during visits to **US Embassy - Ankara.**

3.04 SECURITY CLEARANCES AND INVESTIGATIONS.

a. FACILITY SECURITY CLEARANCES.

All **US Embassy – Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project** Contractor firms requiring access to classified information will have a facility security clearance as required by DO FORM 254.

b. CLASSIFIED STORAGE CAPABILITY.

Contractor firms requiring access to classified information at their offices in the U.S. will have approved storage capabilities as required by the ISM. Storage of classified project material at any site overseas, other than **US Embassy - Ankara**, the Final Construction Site and SSA, is prohibited.

c. PERSONNEL CLEARANCES.

AU Contractor Personnel who require access to classified project material, information, or equipment will be Cleared U.S. Citizens. It is the sole responsibility of the Contractor to ensure that a sufficient number of Cleared U.S. Citizen Contractor Personnel are available to perform work on this contract.

d. CLEARANCE PROCESSING.

Personnel clearances will be handled directly between the Contractor and the Defense Investigative Service Clearance Office (DISCO). Required forms are specified in the ISM.

It is the responsibility of the Contractor to notify the Department Of State (DOS), Bureau of Diplomatic Security, (DS/PRD/lN) by Visit Request (See Paragraph 104, Chapter 6, ISM), when security clearances have been granted.

3.05 SECURITY BRIEFINGS.

All Cleared U.S. Citizen Contractor Personnel who will be assigned abroad to~ Ankara to work on the **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project** will receive an Executive Order 12356 Security Briefing from their facility security officer, relating to the handling and protection of classified information, and sign Standard Form 312 [Classified information Nondisclosure Agreement].

All Contractor Personnel, except local nationals, will be provided a briefing regarding host country and **US Embassy – Ankara** security policies by the Regional Security Officer (RSO) – **Ankara.**

3.06 DOS INVESTIGATION OF FOREIGN NATIONAL PERSONNEL.

a. OPTIONAL FORM (OF) 174.

The Contractor will be required to submit to the FBO PD two completed OF-174s (Application for Employment As a Foreign Service National - See Attachment 4), or similar background form approved by the Site Security Manager and by the RSO, one written in the local language and one in English, for each Foreign National employed on the **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project** - OF 174s must have been submitted and approved upon initiation of construction. Approval of the OF-174 is then required for access to the Final Construction Site.

b. FOREIGN NATIONAL INVESTIGATIONS.

Based upon the OF-174, a screen of background information, police and local agency checks will be conducted by DS on all foreign national firms and personnel employed on the **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project**. The FBO PD will notify the Contractor of the results of the screening as soon as the results are received.

3.07 PROJECT INFORMATION - PROCEDURAL SECURITY. .

All construction plans and documents, including those generated during the construction process, will be appropriately classified, or protectively marked Limited Official Use (LOU), in accordance with published classification guides, and protected in accordance with the ISM, the DS Classification Guide for Design and Construction Projects Overseas, and 5 Foreign Affairs Manual (FAM) 900, Security Regulations.

a. DOCUMENT RESPONSIBILITY.

Contractor Personnel receiving proposed or actual construction plans and documents, to include blueprints, blackline drawings, technical drawings, sketches, photographs, exposed negatives, or descriptive narratives pertaining to the project, will, at all times, be responsible for these materials while in their possession, and will return all such documents, including copies, promptly upon demand by the U.S. Government, . 1

b. SECURITY INCIDENTS - REPORTING REQUIREMENT.

All Contractor Personnel employed on the **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project** will immediately bring all security issues, concerns, or suspected violations to the attention of the FBO PD.

c. DISSEMINATION/DISTRIBUTION.

Unclassified proposed and actual construction documents will be disseminated on a need-to-know basis, and will not be further disseminated without prior authorization from the FBO PD.

d. REMOVAL OF DOCUMENTS FROM WORK SITE.

Unless specifically authorized by the FBO PD, classified material will not be removed from the Final Construction Site.

3.08 PHOTOGRAPHY.

Unless specifically authorized by the SSM/RSO, photography will not be permitted at the Final Construction Site.

3.09 OVERSEAS TRANSFER OF CLASSIFIED DOCUMENTS

All classified, and protectively marked LOU, construction documents or related materials will be transferred to DOS for transmission overseas.

Unclassified documents may be shipped by the Contractor via commercial courier service.

3.10 LOSS/COMPROMISE OF CLASSIFIED INFORMATION. .

Any suspected loss or compromise of classified material will be immediately reported to the FBO PD.

3.11 SITE CONTROL.

The FBO PD will control entry to the Final Construction Site, any Support Sites and the SSA and may deny access to anyone at anytime. Access denial will be initiated through the FBO PD.

3.12 PERSONNEL ACCESS PROCEDURES.

a. IDENTIFICATION [ID] BADGES.

The existing **US Embassy Ankara** picture ID card and temporary pass systems will be utilized for all persons employed at or visiting the Final Construction Site, any Support Sites, and SSA. Mandatory display is required, except for temporary removal for safety reasons. 10 cards and/or temporary passes will be maintained at the Final Construction Site only.

Visitors will be issued Visitor ID cards.

ID cards and temporary passes will not be removed from the Final Construction Site, any Support Sites, or SSA except as noted above

b. ACCESS CONTROL FACILITY (ACF).

All persons will enter the Embassy compound through a compound perimeter gatehouse, mutually agreed upon by the FBO PD and SSM/RSO, where they will pass through a walk-through metal detector (WTMD), and be subject to a search of their possessions. All persons seeking access to the Embassy after normal working hours, as defined in the contract documents, will be required to sign in and out in Visitor's Logs maintained at the gatehouse and/or ACF.

c. COUNTRY CLEARANCE FOR SITE VISITS

The FBO PD will be notified in writing of any proposed Contractor Personnel visits, purpose of the visit, identities, security clearance levels, and itinerary. Contractor Personnel should not travel until written approval is received from the U.S. Government. Visitors will receive appropriate security briefings.

d. VISITOR ESCORT.

All Visitors seeking access to the Final Construction Site must receive authorization from the FBO PD.

3.13 VEHICLE INSPECTION AND CONTROL.

Vehicles, and their contents, entering or leaving a Final Construction Site, Support Site or SSA are subject to inspection. Drivers and passengers may undergo metal detection inspection [WTMD or hand held] prior to entering or leaving the Final Construction Site.

a. PARKING.

Vehicles are not permitted to be parked at the Final Construction Site or SSA without the advance written approval of the FBO PD. Failure to obtain advance approval may, at the option of the U.S: Government, result in the removal of the vehicle from the premises, with the Contractor or owner assuming all resultant costs.

b. DELIVERIES.

Deliveries to the Final Construction Site or SSA will be scheduled a minimum of 24 hours in advance with the FBO PD and made during normal working hours as defined in the contract documents unless specifically approved in advance by the FBO PD. Failure to provide advance notice of delivery will, at the option of the U.S.

Government, result in denial of acceptance of the materials. The U.S. Government will not be responsible for any costs associated with the denial of delivery.

3.14 KEY CONTROL.

Sign-out/Sign-in key control will be established by the SSM/RSO under the 24-hour maintenance of CAGs. Keys to any office, building, equipment, or storage container are not to be removed from the Final Construction Site or SSA or duplicated without the advance approval of the SSM/RSO. Unauthorized removal of keys by Contractor Personnel shall result in the locks being changed at the Contractor’s expense

3.15 PROHIBITED ITEMS.

a. Weapons, illicit substances, alcohol, photographic or electronic equipment, explosives, and recording devices are prohibited on the Final Construction Site, any Support Sites and at the SSA unless approved by the FBO PD.

b. Violation of this prohibition will, at the option of the U.S. Government, result in forfeiture of the item(s) involved and permanent removal of the violating party. The Government will not be responsible for costs associated with the removal and replacement of the terminated party.

3.16 INSPECTION OF MATERIALS & WORK.

The U.S. Government has the unqualified right to inspect any work, materials, or equipment used on the Final Construction Site, any Support Sites, and SSAs at any time.

a. CONSTRUCTION SURVEILLANCE TECHNICIANS [CSTs].

This paragraph is not applicable.

b. INSPECTION PROCEDURES.

In some instances, security inspections may necessitate partial demolition or removal of materials and equipment. While security inspections will primarily concentrate on areas judged sensitive by the FBO PD and/or SSM/RSO, and materials destined for those areas, they will also include random inspections of other areas, to include any Support Sites and SSAs, and materials as directed by the FBO PD.

c. UNAUTHORIZED WORK / MATERIALS.

The FBO PD will direct the suspension of work by Contractor Personnel if unauthorized work is attempted or performed, or unauthorized materials are found to have been incorporated into the **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project**. The U.S. Government will not be responsible for resultant costs in those instances where unauthorized work was attempted or performed.

d. RECTIFICATION OF UNAUTHORIZED WORK.

At the option of the U.S. Government, the Contractor will be responsible for all costs for rectification, of unauthorized work, or introduction of unauthorized materials. At the option of the U.S. Government, contract personnel identified by the U.S. Government as being responsible for the insertion, or attempted introduction, of unauthorized materials, shall be terminated, with all related costs being borne entirely by the Contractor.

3.17 WORK DAY OPERATIONS.

a. WORK SITE LIMITATIONS.

Unless the work is being performed by Cleared U.S. Citizens Contractor Personnel, the Contractor will not initiate any work at the Final Construction Site prior to the arrival of or after the departure of CAGs.

b. SSA PERSONNEL ACCESS.

Personnel access to the SSA will be limited to Cleared U.S. Citizen personnel authorized by the FBO PD. Uncleared personnel in an SSA must be escorted by a Cleared U.S. Citizen.

c. WEEKLY ACTIVITY SCHEDULE.

In order for the FBO PD to effectively schedule required security personnel and activities, the Contractor will provide a Weekly Activity Schedule to the FBO PD. These reports may be augmented by daily oral updates if so directed by the FBO PD.

(1) WEEKLY ACTIVITY SCHEDULE CONTENT.

The Weekly Activity Schedule will identify activities from the Contractor's construction schedule that will be underway during the upcoming week, where this work will be performed, and the number of workers by trade. The Weekly Activity Schedule will also include a summary of the materials to be delivered to the Final Construction Site, any Support Sites and SSA, the number of delivery vehicles, their arrival times and means of identification of delivery vehicles.

(2) CONSTRUCTION HOURS.

Construction activities will be limited to a maximum of 12 hours per day, limited ~to the days identified by the Weekly Activity Schedule. Extended work, such as a concrete pour, which requires more than 12 hours to complete may be approved by the FBO PD with at least 24 hours advance notice.

3.18 STORAGE OF WORKERS' TOOLS

The contractor may provide on-site space for the storage of workers' tools in order to reduce, if not eliminate, the need for daily introduction/removal of these items to/from the Final Construction Site. Adherence to this procedure will serve to facilitate more expeditious security screening of construction personnel as they seek entry to the site.

3.19 LABOR REQUIREMENTS.

a. WORK REQUIRING CLEARED U.S. CITIZEN PERSONNEL.

Only cleared U.S. Citizens with the appropriate security clearances (minimum SECRET unless otherwise required) will install temporary and permanent security equipment. Only cleared U.S. Citizens with the appropriate security clearances (minimum SECRET unless otherwise required) will connect said equipment and the conduit pertaining to said equipment to security systems.:

b. UNCLEARED LABOR.

Uncleared personnel may perform all other work on the **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project**, to include installation of conduit up to the point of connection to security systems.

c. FOREIGN NATIONAL WORK LIMITATIONS.

Construction of the ACF and temporary fence is a function of Contract Section 01505/01501-2 and completion is dependent upon project planning. ACF and temporary fence construction must be completed before general work area construction begins. The temporary ACF, fence, lighting, conduit runs, and other unclassified temporary facilities may be constructed by uncleared workers.

Approved OF 174s and screening through an ACF are required for access to the Final Construction Site before general work area construction begins.

d. DESIGNATED COUNTRY WORK FORCE

Designated Country work force personnel may be used to work on perimeter barriers and wails, guardhouses located at pedestrian and vehicular entrances, landscaping, and other non-sensitive activities not involving the facility itself. Citizens of Designated Countries may also be used as drivers if accompanied at all times by a Cleared U.S. Citizen when transporting CAA Materials or equipment. (See CSS, Paragraph 3.18, a and b)

4.00 ISS MATERIALS AND TRANSIT SECURITY

4.01 GENERAL.

The **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project** will not involve the Embassy's CAA. It is the responsibility of the Contractor to arrange and pay for the transportation of all Raw and General Construction Materials to the Final Construction Site in accordance with the Specifications set forth in this Section. The U.S. Government reserves the right, in its sole discretion, to inspect any materials destined for use in the **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project**, and to determine if any materials cannot be used in the project. If the non-use of any materials results from. the acts or omissions of the Contractor, then the Contractor will be responsible for all associated costs.

Off-site precast/prefabricated products shall not be used in the construction of the **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project** unless previously approved by the FBO PD.

Certain components of the security systems, Integrated Security Systems (ISS) components must be shipped and stored under secure conditions. 155 items consist of the following types of materials, and other equipment, as specified by FBO:

a. Locking devices (keyed cylinders, electronic and manual cypher locks and card-key locking devices which are entegral components of security doors;

b. All anti-intrusion alarm control systems;

c. Closed Circuit TV (CCTV) monitors and control panels, and;

d. Security Interface Cabinet (SIC) components.

ISS Materials will be procured, shipped, stored, and installed by the U.S. Government.

4.02 SPECIFIC BILL(S) OF MATERIALS (BOM)

This paragraph is not applicable.

4.03 PROCUREMENT OF MATERIALS.

a. ISS MATERIALS.

1SS Materials must be procured in the US, consolidated , and securely shipped to the Final Construction Site.

b. GENERAL CONSTRUCTION AND RAW MATERIALS.

General Construction and raw materials or equipment which will be used in the construction of the project may be purchased without security restrictions and procedures. The Contractor will notify the SSM/RSO and FBO PD where the materials will be purchased at least ten (10) days prior to the purchase of materials.

4.04 SECURE PROCEDURES FOR MATERIALS FOR USE IN OTHER PARTS OF THE CAA.

This paragraph is not applicable.

4.05 SHIPPING PROCEDURES.

This paragraph is not applicable.

4.06 CONSIGNMENT AND CUSTOMS CLEARANCE OF CAA MATERIALS.

This paragraph is not applicable.

4.07 ARRIVAL OF SECURE SHIPMENTS AND TRANSPORT TO SITE.

This paragraph is not applicable.

ATTACHMENT 1 – OPTIONAL FORM 174

SECTION 01200 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract Drawings and general provisions of the Contract, including the Contract Clauses and Conditions, the Supplementary Clauses and Conditions and other Division 1 Specification Sections.

1.2 DESCRIPTION OF REQUIREMENTS

1.2.1 Definition: "Cutting and Patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.

1.2.1.1 Cutting and Patching is performed for coordination of the work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.

1.2.1.2 Cutting and patching performed during' the manufacturing of products, or during the initial fabrication, erection or installation processes is not considered to be "cutting and patching" under this definition. Drilling of holes to install fasteners and similar operations are also not considered to be "cutting and patching".

1.3 QUALITY ASSURANCE

1.3.1 Requirements for Structural Work: Unless specifically called for in the contract documents, do not cut and patch structural work in a manner that would result in a reduction of load bearing capacity, load deflection ratio, or fire protective coating.

1.3.2 Deleted.

1.3.3 Visual Requirements: Unless specifically noted on the drawings or required by project design requirements, do not cut and patch work exposed on the building's exterior or in its occupied spaces, in a manner that would, in the FBO/PD's opinion, result in lessening the building's aesthetic qualities. Remove and replace work judged by the Project Director to be cut and patched in visually unsatisfactory manner. The Contractor shall correct any cuts and/or patches not done in accordance with commonly accepted practices of the trade, at no additional cost to the Government.

1.4 SUBMITTALS

1.4.1 Procedural Proposal for Cutting and Patching: Prior approval of cutting and patching is required, therefore submit proposed procedure for this work well in advance of the time work will be performed and request approval to proceed. Include the following information, as applicable, in the submittal:

1.4.1.1 Describe nature of the work and how it is to be performed, indicating why cutting and patching cannot be avoided. Describe anticipated results of the work in terms of changes to existing work, including structural, operational and visual changes as well as other significant elements.

1.4.1.2 List products, equipment, and techniques to be used .

1.4.1.3 Give a schedule of dates when work is expected to be performed.

1.4.1.4 List utilities which will be disturbed or otherwise be affected by work, including those that will be relocated and those that will be out of service temporarily. Indicate how long utility service will be disrupted.

1.4.1.5 Approval by the Project Director to proceed with cutting and patching work does not waive the Government's right to later require complete removal and replacement of work found to be cut and patched in an unsatisfactory manner.

1.4.1.6 Provide adequate collection and removal of water for concrete cutting and coring.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 General: Except as otherwise indicated, or as directed by the Project Director, use materials for patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent practical with regard to visual effect. Use materials for patching that will result in equal or better performance characteristics.

PART 3 - EXECUTION

3.1 INSPECTION

3.1.1 Before cutting, examine the surfaces to be cut and patched and the conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.

3.2 PREPARATION

3.2.1 Temporary Support: To prevent failure provide temporary support of work to be cut.

3.2.2 Protection: Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.

3.2.3 Take precautions not to cut existing pipe, conduit or duct serving the buildings but scheduled to be relocated until provisions have been made to bypass them.

3.2.4 Locate reinforcing by non destructive means to avoid the cutting or coring of steel bars.

3.3 PERFORMANCE .

3.3.1 General: Employ skilled workmen to perform cutting and patching work. Except as otherwise indicated or as approved by the Project Director proceed with cutting and patching at the earliest feasible time and complete work without delay.

3.3.2 Cutting: Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer.

3.3.2.1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chipping, however, impact tools may be used with prior approval of the Project Director. Cut through concrete and masonry using a cutting machine such as a Carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use. Score-cut any cutting prior to using pneumatic type tools to guarantee a neat cutting edge. .

3.3.2.2 Deleted

3.3.2.3 By-pass utility services such as pipe and conduit, before cutting, where such utility services are shown or requited to be removed, relocated or abandoned. Cut off conduit and pipe in walls or partitions to be removed. After by-pass and cutting, cap, valve or plug and seal tight remaining portion of pipe and conduit to prevent entrance of moisture or other foreign matter.

3.3.3 Patching: Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

3.3.3.1 Where feasible, inspect and test patched areas to demonstrate integrity of work.

3.3.3.2 Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.

3.3.3.3 Where removal of walls or partitions extend from one finished area into another finished area, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. If necessary to achieve uniform color and appearance, remove existing floor and wall coverings and replace with new materials over the entire wall, floor, or ceiling plane.

3.3.3.4 Where a patch occurs in a smooth painted surface, extend the prime base and final paint coat over the entire surface plane containing the patch.

3.3.3.5 Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.3.3.6 Provide a demolition plan to the Project Director, for his approval, when pneumatic tools may cause vibration damage to or cause serious interference in the adjacent facilities and equipment.

3.4 CLEANING

Thoroughly clean areas and spaces where work is performed or used as access to work. Remove completely mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01200

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract Drawings and general provisions of the Contract, including the Contract Clauses and Conditions and other Division 1 Specification Sections.

1.2 REQUIREMENTS INCLUDED:

1.2.1 Refer to other Division 1 sections and other contract documents for specifications on administrative or non work related submittals, such as: permits, payment applications, performance and payment bonds, schedule of values, and listing of subcontractors.

1.2.2 The Contractor is responsible to fully coordinate the work. To execute this responsibility, it may be necessary for the Contractor to prepare a Detailed Coordinated Shop Drawing showing all items of work within a given area including the work of various trades/subcontractors. If, in the opinion of the Government, the individual submittals do not clearly or adequately coordinate the work in an area, the PD may require, without additional cost to the Government, the Contractor to submit Coordinated Shop Drawings showing all work in a given area.

1.3 DEFINITIONS:

1.3.1 Refer to Contract Clauses and Conditions, DS 1231, for definitions of shop drawings, product data, samples and other Submittals.

1.3.2 Samples include, but are not limited to:

A. Partial sections of manufactured or fabricated work

B. Small cuts or containers of materials

C. Complete units of repetitively used materials

D. Swatches showing color, pattern, and texture

1.3.3 Miscellaneous submittals include, but are not limited to the following:

A. Specially prepared and standard printed warranties

B. Maintenance agreements

C. Workmanship bonds

D. Survey data and reports

E. Project photographs

F. Testing and certification reports

G. Record drawings

H. Field measurement data

I. Keys and other security protection devices

J. Maintenance tools and spare parts

K. Overrun stock

1.3.4 Submittals for specialized items include, but are not limited to the following:

A. Dust control devices, arrangements and layouts

B. Pedestrian protection and enclosed passageways

1.4 SUBMITTAL PROCEDURES:

1.4.1 Submittals are to be made in two sets comprised of three copies of each item included in the submittal. Two sets will be furnished to the FBO Project Director. Each package shall be accompanied by a transmittal letter stating what, is being transmitted and what person or office it is being sent to and what action is requested to be taken. A duplicate of this transmittal is to be included inside the package with the submittal.

1.4.2 Coordination: Coordinate the preparation and processing of submittals with the performance of the work. Coordinate each separate submittal with other submittals and related activities such as testing, purchasing, fabrication and delivery. The Project Director reserves the right to withhold action on any submittal requiring coordination with other submittals until related submittals are provided.

1.4.3 Submittal Register: Prepare a schedule of work related submittals indicating their initial submittal dates and the dates on which the Government approvals are needed as required to meet the approved Detailed Construction Schedule. Organize the list by the related specification number sequence. Submit this list within 15 days of the date of commencement of the work. This Submittals Register shall include all submittals required in the contract documents. Prepare and transmit each submittal to the Project Director in accordance with the approved schedule.

1.4.4 Review Time: A maximum of 7 calendar days is allowed the USG for review of first submittals and an additional 5 working days for each resubmittal and each repeated review, if necessary. No extensions of time will be authorized because of the Contractor’s failure to transmit submittals to the Project Director sufficiently in advance of the work.

1.4.5 Submittal Preparation: Mark each submittal with a permanent label for identification. Provide the information required on the label for proper processing and recording of action taken, and the following:

A. Name and address of the Contractor

B. Name and address of subcontractor

C. Name and address of supplier

D. Name of manufacturer

E. Number and title of appropriate specification Section

F. Drawing number and detail references, as appropriate

G. Similar definitive information as necessary

H. Provide a space on the label for the Contractor's review and approval markings, and a space for the Project Director's "Action" marking.

1.5 SPECIFIC SUBMITTAL REQUIREMENTS:

1.5.1 General: Specific submittal requirements for individual units of work are specified in the various specification sections. Except as otherwise indicated in those individual specification sections, comply with the requirements specified herein for each type of submittal.

1.5.2 Shop Drawings: Information required on shop drawings includes dimensions, identification of specific products and materials which are included in the work, compliance with specified standards and notations of coordination requirements with other work. Provide special notation of dimensions that have been established by field measurement.

1.5.3 Coordination Drawings: Provide coordination drawings where required for the integration of the work, including work first shown in detail on shop drawings or product data. Show sequencing and relationship of separate units of work which must interface in a restricted manner to fit in the space provided, or function as indicated. Coordination drawings are considered shop drawings and must be definitive in nature.

1.5.3.1 Preparation: Newly prepared information shall be drawn to accurate scale on sheets not less than 8-1/2" x 11" except for actual pattern or template type drawings, the maximum sheet size shall not exceed 30" x 42". Indicate the name of the firm that prepared each shop drawing and provide appropriate project identification in the title block. Provide a space not less than 20 sq. in. beside the title block for marking the record of the review process and the project Director "Action" marking.

1.5.3.2 Submittals: Provide one reproducible and two (2) 'blue-line or black-line prints. The reproducible copy with appropriate comments and action will be returned to the Contractor.

1.5.4 Product Data: General information required specifically as product data includes manufacturer's standard printed recommendations for application and use, compliance with recognized standards of trade associations and testing agencies, and the application of their labels and seals (if any), special notation of dimensions which have been verified by way of field measurement, and special coordination requirements for interfacing the material, product or system with other work. All written material submitted to the Project Director shall be in the English language. Dimensions may be in English or metric units.

1.5.4.1 Preparation: Collect required product data into a single submittal for each unit of work or system. Mark each copy to show which choices and options are applicable to the project. Where product data has been printed to include information on several similar products, some of which are not required for use on the project, or are not included in this submittal, mark the copies to show clearly that such information is not applicable. Where product data must be specially prepared for required products, materials or systems, because standard printed data is not suitable for use, submit data as "shop drawings" and not as "product data."

1.5.4.2 Submittals: For product data submittals, submit two original (printed, not photocopied) and four (4) copies (or additional original printed sheets). One original copy, marked with the appropriate review comments and action, will be returned to the Contractor.

1.5.5 Samples: Submit samples for the Project Director's visual review of general generic kind, color, pattern and texture, and for a final check of the coordination of these characteristics with other related elements of the work.

Samples are also submitted for quality control comparison of these characteristics between the sample submittal and the actual work as it is delivered and installed.

1.5.5.1 Refer to individual work sections of these specifications for additional sample requirements, which may be intended for examination or testing of additional characteristics. Compliance with other required characteristics is the exclusive responsibility of the Contractor; such compliance is not considered in the Project Director's review and "Action" indication on sample submittals.

1.5.5.2 Documentation required specifically for sample submittals includes a generic description of the sample, the sample source or the product name or manufacturer, compliance with governing or cited regulations and recognized standards. In addition, indicate limitations in terms of availability, sizes, delivery time, and similar limiting characteristics.

1.5.5.3 Preparation: Provide samples that are physically identical with the proposed material or product to be incorporated in the work; provide full scale, fully fabricated samples cured and finished in the manner specified. Where variations in color, pattern, or texture are inherent in the material or product represented by the sample, submit multiple units of the sample (not less that 3 units), which show the approximate limits of variations. Where samples are specified for the Project Director's selection of color, texture or pattern, submit a full set of available choices for the material or product. Mount, display, or package samples in a' manner to facilitate the review of indicated qualities.

1.5.5.4 Refer to individual sections of these specifications for samples which, because of their relatively high cost or other special considerations, are intended to be returned to the Contractor for incorporation in the work. Such samples must be in an undamaged condition at the time of use. On the transmittal form to the Project Director indicate such special requests regarding the disposition of sample submittals.

1.5.5.5 Final distribution of sample submittals: One copy of the transmittal form only, marked with appropriate action, will be returned to the Contractor.

1.5.6 Miscellaneous Submittals: Inspection and Test Report Certificate: Identify each inspection and test report certificate as being either "shop drawings" or "product data" depending on whether the report is specially prepared for the project, or a standard publication of workmanship control testing at the 'point of production. Process inspection and test report certificates accordingly.

1.5.6.1 Warranties: In addition to copies desired for the Contractor's use, furnish (2) executed copies of warranties, bonds or agreements. Provide (2) additional copies where maintenance manuals are required.

1.5.7 Closeout Submittals: Refer to section "Project Completion" and to individual sections of these specifications for specific submittal requirements of project closeout information, materials, tools, and similar items.

1.5.7.1 Record Documents: Refer to Contract Clauses and Conditions, DS 1231, 2.3.2.

1.5.7.2 "As-Built" Documents: Refer to Contract Clauses and Conditions, DS 1231, 2.3.3.

1.5.7.3 Operating and Maintenance Data: Furnish (3) bound copies of operating data and maintenance manuals.

1.5.7.4 Materials and Tools: Refer to individual sections of these specifications for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.

1.6. RETURNS

1.6.1 Any submittal which does not have the Contractor's approval shall be returned without review. The review time will not start until the submittals are submitted in accordance with this section and with the Submittals provisions of the Contract Clauses and Conditions, Form DS 1231.

1.7 USE OF APPROVED SUBMITTALS

1.7.1 Final Distribution: Furnish copies of approved submittals to subcontractors, suppliers, fabricators, manufacturers, installers, governing authorities and others as required for proper performance of the work. Show distribution on transmittal forms.

1.7.2 Installation Copy: Do not proceed with installation of materials, products and systems until a copy of the appropriate approved submittal applicable to the installation is in the possession of the installer. Do not permit the use of unmarked copies of submittals in connection with the performance of the work.

1.8 CONTRACT DEVIATIONS

1.8.1 Submittals are required for the purpose of showing in detail how the Contractor will execute the Contract requirements. If in the course of the work, the Contractor needs to deviate from the Contract requirements, he may request that deviation in the submittal process. All deviations requested must be detailed on the transmittal form submitting the Submittal and highlighted on the technical portion of the Submittal. Deviations so marked, when acceptable, will be approved. When the deviation is not formally requested by annotation on the transmittal and highlighted on the submittal, whether the submittal has been approved or not, is not approved and the Contractor must comply with the original requirements of the Contract. Deviations involving a time or financial impact to the project shall be so noted on the transmittal document at the time of the initial request to deviate and, if approved, shall result in a formal Contract Modification.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01300

SECTION 01310 - CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract drawings and general provisions of the Contract, including the Contract Clauses and Conditions, the Supplementary Clauses and Conditions and other Division 1 Specification Sections.

1.2 DETAILED CONSTRUCTION SCHEDULE

1.2.1 The Detailed Construction Schedule is the:

A. Primary construction period plan and schedule.

B. Primary historical record of work performed.

C. Means of analyzing time extensions, and the impact of changes and delays. .

D. Primary Contractor's management tool for planning daily, weekly and monthly effort; coordination with Subcontractors and other prime Contractors; and to assure timely sequencing and interfacing of non-field and field work.

1.2.2 The Detailed Construction Schedule shall be prepared by the Contractor and submitted to the Project Director within (15) calendar days from the date of the Notice to Proceed. The Project Director will review the schedule for accuracy of the network, logic, and soundness of duration and payment amounts assigned to each activity. The Project Director's comments and acceptance or request for refinement will be transmitted in writing to the Contractor.

1.2.3 The Construction Schedule network shall be in the form of a time scaled logic flow diagram or a Bar Chart satisfactory to the Project Director. The maximum number of activities shall be determined by the complexity of the project not by the method used to prepare the logic diagram. The activities shall represent definable and quantifiable tasks for the type of work being scheduled. Major milestone dates shall be noted with a flag. Significant delivery or intermediate completion restraints shall be included.

1.2.4 The Detailed Construction Schedule shall include man power loading and cost loading for each activity. As a part of the Detailed Construction Schedule, the Contractor shall prepare an "S" curve depicting the schedule of earnings and the schedule of labor for the Project. These "S" curves shall be drafted on separate pages and the direction of the time axis shall be the same as the time axis on the logic flow diagram. The scale of these two diagrams should be the same as the Initial Summary Schedule submitted earlier.

1.3 REPORTING

1.3.1 Schedule Reports shall be prepared in numerical order of activities and in the order of total float amount for each activity commencing with the least float. Where more than one activity has the same amount of total float, the activities with the same float are to be listed in activity number sequence.

1.3.1.1 If a bar chart schedule is used, comparative conditions shall apply.

1.3.2 Monitoring: The Contractor shall employ the schedule to plan work efforts in the field and to meet procurement, fabrication, delivery, and submissions schedules. The various forms of monitoring are detailed below.

1.3.2.1 The progress of the Project work shall be formally monitored on a monthly basis.

1.3.2.2 The Contractor, upon completion of the inspection, shall update the network and Schedule Reports and submit them to the Project Director for review and approval. Additionally, the Contractor shall calculate the percent complete and amounts due for the monitor period and submit them for the Project Director's approval.

1.3.2.3 The Project Director will review the data and reports submitted by the Contractor for accuracy, conformance with the approved Detailed Construction Schedule, and viability of the Contractor's plan to maintain or improve progress. If inadequate, the Project Director may require changes, resubmittals, and/or appropriate performance improvement.

1.4 ANALYSIS OF TIME EXTENSION REQUESTS

1.4.1 The Project Director will analyze all requests for time extensions on Change Orders and Contractor Claims based on the approved Detailed Construction Schedule. If the work on the Critical path is not affected by a delay or if the duration of the delay does not cause the Critical path to go through the delayed work, no time extension is justified and rio extension of time will be granted regardless of the source of the delay.

1.5 CONTRACT MODIFICATIONS AND CHANGE ORDERS

1.5.1 As required by the Contract Clauses and Conditions, the Contractor shall revise the Detailed Construction Schedule periodically to reflect changes made in the Contract duration or in the work to be performed. Only those changes reflected on Modifications issued by the Contracting Officer or his authorized representative shall be incorporated into the schedule. When revisions are made, they shall be submitted to the PD for review and approval before actually becoming a part of the Detailed Construction Schedule.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION - NOT APPLICABLE

END OF SECTION 01310

SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract drawings and general provisions of the Contract, including the Contract Clauses and Conditions, the Supplementary Clauses and Conditions and other Division 1 Specification Sections, apply to work of this section.

1.2 DEFINITION

1.2.1 Quality Control: Those actions related to the physical characteristics of the materials, systems, and services which provide the means to measure, evaluate and control those characteristics to predetermined quantitative criteria. It involves surveillance inspection, testing, reporting and corrective measures.

1.3 QUALITY CONTROL PLAN

1.3.1 The Contractor shall furnish for approval by the Government, not later than 15 days after receipt of Notice to Proceed, the Contractor Quality Control (CQC) Plan with which he proposes to implement the requirements of the Contract Clause entitled “Inspection and Correction of Work.” The plan shall identify personnel, procedures, instructions, records, and forms to be used.

1.3.2 Deleted.

1.3.3 The Quality Control plan shall include as a minimum, the following:

A. A description of the quality control organization, including chart showing lines of authority and acknowledgment that the CQC staff shall conduct the phase inspections for all aspects of the work specified and shall report to the project manager or someone higher in the contractor’s organization.

B. The name, qualifications, duties, responsibilities and authorities of each person assigned a QC function. These persons may have other duties on the project including line supervision, office function, etc.

C. A copy of the letter to the QC manager signed by an authorized official of the firm, which describes the responsibilities and delegates the authorities of the QC manager.

D. Procedures for scheduling and managing submittals, including those of subcontractors, off site fabricators, suppliers and purchasing agents.

E. Control testing procedures for each specific test. (Laboratory facilities will be approved by the Contracting Officer’s Technical Representative.)

F. Reporting procedures including proposed reporting formats.

1.3.4 Deleted.

1.3.5 After Government acceptance of the QC plan, the contractor shall submit any proposed change to the Project Director in writing for approval.

1.4 QUALITY CONTROL ORGANIZATION

1.4.1 The contractor shall identify an individual, within his organization at the site of the work, who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the contractor. This CQC System Manager shall be approved by the Government. The CQC Manager may be a person with other duties on the project. Other contractor personnel, either dedicated CQC personnel or personnel having other duties, shall be available as necessary to fulfill all requirements of the approved CQC Plan.

1.5 SUBMITTALS

1.5.1 Submittals shall be as specified in the Contract Clause entitled "Submittals." The CQC Organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

1.6. CONTROL

1.6.1 Contractor Quality Control is the means by which the contractor assures himself that his construction complies with the requirements of the contract plans and specifications. The controls shall be adequate to cover all construction operations, including both onsite and off site fabrication, and will be keyed to the proposed construction sequence. The controls shall include an inspection program for all definitive features of work.

1.6.1.1 Inspections shall be performed prior to beginning any work on any definable feature of work. It shall include a review of the Contract Requirements, confirmation that all required submittals have been submitted and approved, confirmation that all required materials, qualified installers and necessary test and inspection equipment is on site and available, and confirmation that all substratum has been inspected and meets the contract requirements. The Contractor shall notify the PD at least two business days prior to conducting a preparatory inspection and a report on said inspection shall be made a part of the written record. Follow-up and completion inspections shall be made as necessary in the manner described above.

1.7 TESTS

1.7.1 The contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements. If laboratory testing is required, the contractor shall procure the services of an industry recognized testing laboratory or he may establish a testing laboratory approved by the Project Director at the project site. A list of tests which the contractor understands he is to perform shall be furnished as a part of the CQC plan.

1.7.2 Project laboratory: The Project Director will have the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

1.8 COMPLETION INSPECTION

1.8.1 At the completion of all work or any increment thereof established by a completion time stated in the specifications, the CQC System Manager shall conduct a completion inspection of the work and develop a "punch list" of items which do not conform to the approved plans and specifications. Such a list shall be included in the CQC documentation, as required by paragraph 1.9 below, and shall include the estimated date by which the deficiencies will be corrected. The CQC Manager or his staff shall make subsequent completion inspections as necessary to ascertain that all deficiencies have been corrected and so notify the Project Director. The completion inspection and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

1.9 DOCUMENTATION

1.9.1 The contractor shall maintain current records of quality control operations, activities, and tests performed including the work of suppliers and subcontractors. These records shall be on an acceptable form and indicate a description of trades working on the project, the numbers of personnel working, the weather conditions encountered, any delays encountered, and acknowledgment of deficiencies noted along with the corrective actions taken on current and previous deficiencies. In addition, these records shall include factual evidence that required activities or tests have been performed, including but not limited to the following:

A. Type and number of control activities and tests involved.

B. Results of control activities or tests.

C. Nature of defects, causes for rejection, etc.

D. Proposed remedial action.

E. Corrective actions taken.

1.9.2 These records shall cover both conforming and defective or deficient features and shall include a statement that supplies and materials incorporated in the work comply with the contract. Legible copies of these records shall be furnished to the Project Director.

1.10 NOTIFICATION OF. NONCOMPLIANCE

1.10.1 The Project Director will notify the Contractor of any noncompliance with the foregoing requirements. The contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the contractor or his representative at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

END OF SECTION 01400

DIVISION 1 - CONTRACT SECTION 01502
TEMPORARY FACILITIES AND SERVICES SPECIFICATIONS
FOR
SECURITY PERSONNEL

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SECTION 01502 – TEMPORARY FACILITIES AND SERVICES SUPPORT SPECIFICATION

1.01 TEMPORARY SECURITY EQUIPMENT AND FACILITIES (TSEF).

The Contractor is required to provide and maintain for the duration of the **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project** construction period the following TSEF. Each of the facilities identified below require the FBO PD's approval for location and orientation. The Contractor must submit a TSEF plan within 30 days after receipt of the Notice to Proceed showing proposed locations for the FBO PD's final approval. The TSEF plan must evaluate the use of any or part of the existing buildings on the site for use as temporary security facilities. The FBO PD will notify the Contractor of the approval or disapproval of the TSEF plan within 10 days of the receipt of the plan. The arrival of security site personnel and the installation of technical security equipment will occur in conjunction with the start of site preparation.

All costs associated with temporary security facilities and equipment furnished and installed will be included in the contract price, and therefore no separate payment will be made. The Contractor will provide all temporary security facilities and services described herein in conjunction with site preparation and prior to the actual commencement of work on the project building.

a. FENCING.

Provide fencing as follows:

(1) Final Construction Site Perimeter.

Not Applicable. .

(2) Back-up Generator(s).

If a Contractor furnished back-up generator is used, the Contractor will install a chain link fence 2.4 meters (8 feet) in height, topped with three strands of barbed wire extending outward at a 45-degree angle, around it. (Paragraph 1.01, f). The gate to this fenced area will be locked with a U.S. Government-provided security lock. .

(3) Secure Storage Area.

Not Applicable.

(4) Sally Port. .

Not Applicable.

(5) Fence Specifications.

Chain link fencing identified above will meet the following Specifications:

(a) Posts.

All posts will be able to pass a pull test when a force of 22.5 kilograms (50 pounds) is applied perpendicular to the fence at the top of the post. The post will not deflect more than 5 centimeters (2 inches) from the location where the force is applied.

(b) Corner Posts, End Posts, and Pull Posts.

All posts in this category will be equivalent to a minimum of 2-7/8-inch O.D. galvanized schedule 40 pipe. All posts are to be plumb within plus/minus 5 degrees in two planes. Pull posts will be used at all abrupt changes in grade and at intervals no greater than 152 meters (500 feet). On runs over 152 meters (500 feet), space pull posts evenly between corner or end posts.

(c) Line Posts.

All posts within this category will be equivalent to a minimum of 2-3/8-inch O.D. galvanized schedule 40 pipe. Posts are to be spaced equidistant in the fenceline with a maximum of 3 meters (10 feet) on center. All posts are to be plumb within plus/minus 5 degrees in two planes.

(d) Fence Fabric.

The fabric will be 9-gauge galvanized steel, 2-inch mesh chain link. The top selvage wilt be twisted and barbed, and the bottom selvage will be knuckled. Stretcher bars will be threaded through the fabric using one bar for each gate and end post and two for each corner and pull post. The fabric will be pulled tight so that the maximum deflection of the fabric is 2 inches when a 22.5 kilograms (50 pounds) pull is exerted perpendicular to the center of the panel. Maintain tension by securing stretcher bars to posts with metal bands spaced no farther than 15 inches on center. Fasten the fabric to the steel framework with 9-gauge steel wire ties spaced no farther than 30.5 centimeters (12 inches) on center for alt posts, rails, braces, and tension wires. Fabric will not be free to move along the framework. The fence will be grounded every 100 meters (110 yards) by a 1.8 meter (6 feet) ground rod connected to the fence fabric with grounding damps and number 10 gauge wire.

(e) Fence Protection System.

Not Applicable.

(f) Intrusion Detection Systems.

Not Applicable.

b. ACCESS CONTROL FACILITY (ACF).

Marine Security Guard Post 1 will constitute the Access Control Facility for the **Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project**. The Project will involve the temporary relocation and subsequent construction of a new MSG Post 1. The Contractor will construct an ACF in accordance with project drawings and specifications. (Paragraph 1.01).

c. VEHICLE ACCESS POINT. Not Applicable.

d. SECURE STORAGE AREA (SSA).

Materials requiring secure storage will be stored within the Controlled Access Area of U.S. Embassy, Ankara. The Contractor is not required to construct a separate SSA.

e. LIGHTING.

This section lists the lighting systems that will be in place at the start of construction.

(1) Perimeter Lighting.

Not Applicable.

(2) Vehicular Entrance Lighting.

Not Applicable.

(3) ACF Exterior Lighting.

The lighting system installed to illuminate the exterior of the ACF will provide an illumination level of 1.5 foot-candles to a minimum height of 2.4 meters (8 feet) above ground. The lights will be equipped with automatic restart capability.

(4) Structural Repair of Motor Pool Building's Warehouse and Auto Repair Shop Project Building Lighting.

The existing Post lighting system wilt be utilized.

f. GENERATOR.

If required, the Contractor will provide and install a backup generator to supply emergency power for security lighting, temporary security equipment, and U.S. Government temporary facilities. The fuel supply for the generator shall be stored in accordance with U.S. Army Corps of Engineers Safety and Health Manual EM 385-1-1. At a minimum, 2.5 KVA of regulated power will be provided exclusively for temporary security equipment, excluding security lighting.

g. CONDUIT AND WIRING.

The Contractor will provide and install all necessary conduit and wiring for any temporary CCTV, intrusion detection, and lighting systems. Where possible, all wiring will be installed overhead in accordance with NEC guidelines to allow for construction and grading to be accomplished without interference. Signal and power cables will be separated by 1 meter (3 feet) when run overhead. All security wiring will pass through a Security Interface Cabinet (SIC) for ease of maintenance and troubleshooting.

h. ADDITIONAL TEMPORARY SECURITY EQUIPMENT.

This paragraph is not applicable.

i. SECURITY OF TEMPORARY OPENINGS TO THE FACILITY.

The Contractor shall install temporary door, window and/or other coverings made of construction plywood or other readily available materials, as approved by the FBO PD, on any temporary openings to the facility which are 96 square inches or larger. These coverings shall be either lockable by DS approved locking devices or securely attached to the building until such time as they are replaced by permanent installations. Intrusion detection devices and CCTV will be integrated into the project site to complement existing systems as appropriate. MSG Post 1 will monitor the technical security equipment and respond to violations as necessary.

1.02 ACF OFFICE FURNISHINGS AND EQUIPMENT.

Not Applicable.

a. ACF FURNITURE ITEMS.

Not Applicable.

1.03 MAINTENANCE AND JANITORIAL SERVICES.

Not Applicable.

a. UTILITY SYSTEMS.

Not Applicable.

b. GARBAGE HANDLING.

Provide garbage and refuse collection, removal, and disposal for project related debris. Collection will be daily.

c. WATER SYSTEM.

Provide all water required to effect all project functions.

d. ROUTINE MAINTENANCE.

Not Applicable.

e. DUST CONTROL.

Provide dust control in the areas adjacent to construction activity

f. PEST CONTROL.

Not Applicable.

1.04 FIRST-AID FACILITIES.

Not Applicable.

1.05 TEMPORARY FACILITIES COSTS.

All costs of procuring, transporting, installing, operating, relocating, replacing, and/or removing all temporary security facilities, furnishings, materials, and equipment will be borne by the Contractor and included in the breakout for mobilization in the cost-loaded network analysis system.

DETAILS OF TEMPORARY PERIMETER FENCE

AND

SCHEMATIC SECURITY EQUIPMENT PLACEMENT

SECTION 01505 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract Drawings and general provisions of the Contract, including the Contract Clauses and Conditions, the Supplementary Clauses and Conditions and other Division 1 Specification Sections, apply to work of this section.

1.2 TEMPORARY UTILITY SERVICES:

1.2.1 The types of utility services required include, but are not limited to, water, sewerage, surface drainage, electrical power, and telephones.

1.2.2 Potable water: The Contractor shall arrange for providing and dispensing suitable drinking water, bottled if deemed necessary, and disposable paper cups for his staff and employees (including Government representatives and subcontractors) throughout the construction period where potable water is not available from the public water system. Reference also Section 01531, Safety Program. Potable water is not available from the Post.

1.2.3 Nonpotable Water: Water for construction purposes may be drawn from the public water supply providing it is suitable for use in construction. The Contractor shall arrange for necessary taps. The Contractor shall arrange and pay for disconnection at the conclusion of the construction period. All discharge points for non-potable water shall have a sign “NOT FOR DRINKING” in English and Turkish languages.

1.2.4 Deleted.

1.2.5 Deleted.

1.2.6 Temporary Power: Provide temporary electrical power lines and connections on site for use by all trades. The cost of electrical power for the project will be paid by the Post.

1.3 TEMPORARY CONSTRUCTION FACILITIES:

1.3.1 The types of temporary construction facilities required include, but are not limited to, water distribution, drainage, dewatering equipment, enclosure of work, heat, ventilation, electrical power distribution, lighting, hoisting facilities, stairs, ladders, and roads. Provide facilities reasonably required to perform construction operations properly.

1.3.2 Enclosure: Provide temporary enclosure where indicated and where reasonably required to ensure adequate workmanship and protection from weather and unsatisfactory ambient conditions for the work.

1.3.3 Electrical Power: Provide weatherproof, grounded, power distribution system sufficient to accommodate construction operations requiring power, use of power tools, lighting, and start-up testing of permanent electric powered equipment prior to its permanent connection to electrical system. Provide overload protection. Locate multiple outlets at each storey of construction, spaced so

that entire area of construction can be reached by power tools on a single extension cord of 100' maximum length. Reference Section 01531, Safety, for additional requirements.

1.3.4 Lighting: Provide sufficient temporary lighting to ensure proper workmanship everywhere by combined use of daylight, general lighting, and portable plug-in task lighting. Provide general lighting with local switching which will enable energy conservation during periods of varying activity (work in progress, traffic only, security check, lockup, etc.).

1.3.5 Access Provisions: Provide ramps, stairs, ladders and similar temporary access elements as reasonably required to perform the work and facilitate its inspection during installation. Comply with reasonable requests of governing authorities performing inspections. When permanent stairs are available for access during construction, cover finished surfaces with sufficient protection to ensure freedom from damage and deterioration until the time of final completion.

1.4 PROTECTION OF THE SITE:

1.4.1 Building Enclosure and Lockup: At earliest possible date, secure parts of the building undergoing reconstruction against unauthorized entrance at times when the FBO and Contractor's personnel are not working. Provide secure temporary enclosures at ground floor and other locations of possible entry, with locked entrance.

1.4.2 Environmental Protection Procedures: Provide facilities, establish procedures, and conduct construction activities, in a manner which will minimize generation of wastes, pollution of air/water/soil, and similar harmful or deleterious effects which might violate regulations or reasonably irritate persons at or in vicinity of project site.

1.5 TEMPORARY SUPPORT FACILITIES:

1.5.1 The types of temporary support facilities required include, but are not limited to: field offices, storage sheds, fabrication sheds, sanitary facilities, drinking water, first aid facilities, bulletin board, private and public telephones, clocks, thermometer, project identification signs, cleanup facilities, waste disposal service, and similar miscellaneous general services, all as may be reasonably required for proficient performance of the work and accommodation of personnel at the site. Discontinue and remove temporary support facilities immediately after substantial completion. Locate temporary support facilities for convenience of users, and for minimum interference with construction activities, as authorized by the Project Director.

1.5.2 Sanitary Facilities: Provide toilet facilities acceptable to the Project Director. Provide separate facilities for male and female personnel when both sexes are working at the project site.

1.5.3 SUBMITTALS: The Contractor shall submit written and graphic information to the Project Director fully explaining construction storage yard fence, gates, locks, lights, storage containers and offices, trash chute and containers, hoist and any other construction support or enclosure items intended for use. Show path of supply truck's approach, unloading position and leaving route. .

PART 2 - PRODUCTS - (NOT APPLICABLE)

PART 3 - EXECUTION - (NOT APPLICABLE)

END OF SECTION 01505

SECTION 01531 - SAFETY PROGRAM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract Drawings and general provisions of the Contract, including the Contract Clauses and Conditions, Supplementary Clauses and Conditions and other Division 1 Specification Sections.

1.1.2 Local safety rules and regulations if deemed mote stringent than regulations cited in the Contract, apply to this work.

1.2 SAFETY

1.2.1 The Contractor shall comply with the U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, latest version, and shall assume full responsibility and liability for compliance with all other applicable standards and regulations pertaining to accident prevention, life, health, and safety of personnel; as well as preventing damage to materials, supplies, and equipment. The Contractor will hold the Government harmless for any action, error, or omission on the part of itself, its employees, or its subcontractors that results in illness, injury or death.

1.2.2 The Contractor shall develop and submit to the Project Director for approval, a project safety program showing the means by which he expects to protect the construction site, the adjacent property, public access, existing building to remain and new construction against damage and loss, and by which he will promote personnel safety for all trades. This program shall be submitted within 14 days of move on to the site. Failure to provide such a program may cause the work to be suspended by the Project Director. At the discretion of the Project Director, partial payment will not be made to Contractor prior to receipt and approval of the written safety program.

1.2.2.1 The project safety program shall require “Tool Box” Safety Meetings to be held on a weekly basis. All employees shall attend “Tool Box” meetings. The meeting are to take a minimum of 15 minutes weekly. The Contractor shall also program as a minimum, a weekly walk-through safety inspection. This inspection shall be documented and submitted to the Project Director within 24 hours of the inspection.

1.2.2.2 The pro5ect safety program shall be submitted to the Project Director for his review, comments and approval, however, the Project Director’s approval shall not relieve the Contractor of his responsibility to comply with the requirements of EM 385-1-1 and local requirements as applicable.

1.3 ACCIDENT INVESTIGATION AND REPORTING

1.3.1 The Contractor shall report all accidents resulting in lost time, disabling or fatal injuries along with those involving damage to vehicles, property, materials, supplies, and/or equipment. A standard form will be furnished to the Contractor along with instructions on how to prepare and submit a report for each reportable accident occurring on the Project site. Reports shall contain the Contractors measures to prevent recurrence of each accident. The Contractor will use Form ENG 3394 to report accidents to the Project Director. Copies of this form may be obtained from the Project Director.

1.4 COMPLIANCE WITH LOCAL REGULATIONS

1.4.1 Observance of local regulations, if any, is required. The handling and storage of explosives, operation of steam boilers, operation of cranes in the vicinity of power lines, operation of labor camps and other related activities normally require permits and periodic inspection by local jurisdictions. The Project Director will arrange for permits and periodic inspections when they are required by local authorities.

1.5 ASBESTOS

1.5.1 If during the execution of the Project the Contractor believes that asbestos has been discovered in the work area, he is to immediately notify the Project Director in writing. If the results of the test confirm that asbestos has been encountered, the U.S. Government will arrange with the Contractor or others to have the asbestos removed from the work area.

PART *2* - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01531

SECTION 01540 - SECURITY REGULATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract Drawings and general provisions of the Contract, including the Contract Clauses and Conditions, Supplementary Clauses and Conditions and other Division 1 Specification Sections.

1.2 SECURITY REQUIREMENTS:

1.2.1 The Contractor shall comply with the U.S. Department of State, Bureau of Diplomatic Security, Construction Security Plan, and other Construction Security Specifications for this project which form a part of these specifications by reference.

1.2.2 For any part of the Government furnished security plan requiring alternative actions by the Contractor, Contractor shall submit its Security Plan stating the actions it will take to effect compliance. The Contractor's Security Plan shall be submitted to the Project Director for approval within 14 days after receipt of the NTP.

1.2.3 Unless specifically included in the Construction Security Plan, local workers will not in general be permitted outside the prescribed limits of the construction work site. If authorized in the Construction Security Plan, with the prior written approval of the Project Director, the trash and debris removal personnel and the materials delivery personnel shall be permitted on the job site under controlled circumstances, for specific purposes, for approved durations and timings, and at designated locations. The workers shall at all times be under Cleared Embassy escort and continuous surveillance.

1.2.4 Not used.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01540

SECTION 01631 – PRODUCTS AND SUBSTITUTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract Drawings and general provisions of the Contract, including the Contract Clauses and Conditions, Supplementary Clauses and Conditions and other Division 1 Specification Sections.

1.2 DEFINITIONS:

1.2.1 "Products" are items purchased for incorporation in the Work, regardless of whether they were specifically purchased for the project or taken from the Contractor's previously purchased stock. The term "product" as used herein includes the terms "material," "equipment," "systems," and other terms of similar intent.

1.2.2 "Materials" are products that must be substantially cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form units of work. .

1.2.3 "Equipment" is defined as a product with operational parts, regardless of whether motorized or manually operated, and in particular, a product that requires service connections such as wiring or piping.

1.3 SUBSTITUTIONS:

1.3.1 The Contractor's request for changes in the products, materials, equipment and methods of construction required by the Contract Documents are considered requests for substitutions and are subject to the requirements specified herein. The following are not considered as substitutions:

1.3.2 Revisions to the Contract Documents, where requested by the Government, are considered as "changes," not substitutions.

1.3.3 Specified Contractor options on products and construction methods included in the contract documents are choices available to the Contractor and are not subject to the requirements for substitutions herein specified.

1.3.4 Except as otherwise provided in the contract documents, the Contractors determination of and compliance with governing regulations and orders as issued by governing authorities do not constitute "substitutions: and do not constitute a basis for Change Orders.

1.4 QUALITY ASSURANCE:

1.4.1 Source Limitations: To the fullest extent possible, provide products of the same generic kind, from a single source, for each unit or work. When it is discovered that specified products are available only from sources that do not or cannot produce an adequate quantity to complete project requirements in a timely manner, consult with the Project Director for a determination of what product qualities are most important before proceeding. The Project Director will designate those qualities, such as visual, structural, durability, or compatibility, that are most important. When the Project Director

determination has been made, select products from those sources that produce products that possess the most important qualities, to the fullest extent possible.

1.4.2 Compatibility of Options: Compatibility of products is a basic requirement of product selection. When the Contractor is given the option of selecting between two or more products for use on the project, the product selected must be compatible with other products previously selected, even if the products previously selected were also Contractor options. The complete compatibility between the various choices available to the Contractor is not assured by the various requirements of the Contract Documents but must be provided by the Contractor. If options are allowed, the Contractor must advise the Project Director if any difference and assure the Project Director of the compatibility.

1.5 SUBMITTALS:

1.5.1 Requests for Substitutions: Submit copies of each request for substitution. In each request identify the product or fabrication or installation method to be replaced by the substitution; include related specification section and drawing numbers, and complete documentation showing compliance with the requirement for substitutions stated in "Substitutions" in OS 1231, Contract Clauses and Conditions. Proprietary details, such as ballistic assemblies, are not intended to restrict competition, however, substitute assemblies and materials must meet and be equal to DOS approved/tested products and adjustments in assemblies and materials shall be the

Contractor's responsibility and shall be fully represented in shop drawings. Include the following information, as appropriate, with each request.

1.5.1.1 Provide complete product data, drawings and descriptions of products, and fabrication and installation procedures.

1.5.1.2 Provide samples where applicable or requested.

1.5.1.3 Provide a detailed comparison of the significant qualities of the proposed substitution with those of the work originally specified. Significant qualities include elements such as size, weight, durability, performance and visual effect where applicable.

1.5.1.4 Provide complete coordination information. Include all changes required in other elements of the work to accommodate the substitution, including work performed by the Owner and separate Contractors.

1.5.1.5 Provide a statement indicating the effect the substitution will have on the work schedule in comparison to the schedule without approval of the proposed substitution. Include information regarding the effect of the proposed substitution on the Contract Time.

1.5.1.6 Provide complete cost information, including a proposal of the net change, in the Contract Price, if any.

1.5.1.7 Provide certification by the Contractor to the effect that, in the Contractor's opinion, after thorough evaluation, the proposed substitution will result in work that in every significant respect is equal to or better than the work required by the Contract documents, and that it will perform adequately in the application indicated. . Include in this certification the Contractor's waiver of rights to additional payment or time, which may subsequently be necessary because of the failure of the substitution to perform adequately.

1.5.2 The Government's Action: Within seven days of receipt of the Contractor's request for substitution, the Project Director will request additional information or documentation as may be needed for evaluation of the request. Within two weeks of receipt of the requested additional information or

documentation, whichever is later, the Project Director will notify the contractor of either the acceptance or rejection of the proposed substitution.

1.5.2.1 Acceptance will be in the form of a Change Order.

1.5.2.2 Rejection will include a statement giving reasons for the rejection. The Project Director's decision is final.

1.6 PRODUCT, DELIVERY, STORAGE, AND HANDLING:

1.6.1 Deliver, store, and handle products in accordance with manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft. Control delivery schedules to minimize long-term storage at the site and to prevent overcrowding of constructions spaces. In particular, coordinate delivery and installation to ensure minimum holding or storage times for items known or recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other sources of loss. .

1.6.2 Refer to "Imported Materials, Equipment and Personnel" in Contract Clauses and Conditions, OS 1231 relating to importation of products and delivery to the site.

1.6.3 Deliver products to the site in a sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing. In containerizing shipments, ensure that all components of a products or systems are shipped together.

1.6.4 Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

1.6.5 Store heavy materials away from the project structure in a manner that will not endanger the supporting construction. .

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT COMPLIANCE:

2.1.1 Requirements for individual products are indicated in the Contract Documents; compliance with these requirements may be specified in any one of several different specifying methods, or in any combination of these methods. These methods include the following:

A. Description.
B. Performance.
C. Compliance with Reference Standards.
D. Compliance with DOS - tested/approved assemblies.
E. Compliance with codes, compliance with graphic details, allowances, and similar provisions of the contract documents also having a bearing on the selection process.

2.1.2 Procedures for Selecting Products: The Contractor's options in selecting products are limited by requirements of the Contract Documents, governing regulations, and DOS Criteria and Standards. They are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects. Required procedures include but are not limited to the following for the various indicated methods of specifying:

2.1.2.1 Proprietary Specification Requirements: The Government may, at its option and upon notification to the Contractor, direct a specific location or source of procurement by the Contractor. Refer to "Direct Procurement" in the Contract Clauses and Conditions, DS 1231.

2.1.2.2 Nonproprietary Specification Requirements: Where the specifications name products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to the use of these products only, the Contractor may, at his option, and with the approval of the Project Director use any available product that complies with contract requirements.

2.1.2.3 Descriptive Specification Requirements: Where the specifications describe a product or assembly generically, in detail, listing the exact characteristics required, but without use of a brand or trade name, provide products or assemblies that provide the characteristics indicated and otherwise comply with contract requirements.

2.1.2.4. Performance Specification Requirements: Where the specifications require compliance with indicated performance requirements, provide products that comply with the specific performance requirements indicated, and that are recommended by the manufacturer for the application indicated provided such products are DOS tested/approved items. The manufacturer's recommendations may be contained in published product literature, or by the manufacturer's individual certification of performance. General overall performance of a product is implied where the product is specified for specific performances.

2.1.2.5 Compliance with Standards, Codes and Regulations: Where specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that complies with specification requirements, including the standards, codes and regulations.

2.1.2.6 Visual Matching: Where matching an established sample is required, the final judgment of whether a product proposed by the Contractor matches the sample satisfactorily will be determined by the Project Director. Where there is no product available within the specified product category that matches the sample satisfactorily and also complies with other specified requirements, comply with the provisions of the Contract Documents, and Contract Clauses and Conditions concerning "substitutions" and "change orders" for the select-ion of a matching product in another product category, or for noncompliance with specified requirements.

2.1.2.7 Visual Selection: Except as otherwise indicated, where specified product requirements include the phrase "..as selected from the manufacturer's standard colors, patterns, textures.." or similar phrases, the Contractor has the option of selecting the product and manufacturer, provided the selection complies with other specified requirements. The Project Director is subsequently responsible for selecting the color, pattern and texture from the product line selected by the Contractor.

2 .2 SUBSTITUTIONS:

2.2.1 Conditions: The Contractor's request for a substitution will be received and considered when extensive revisions to the Contract Documents are not required, when the proposed changes are in keeping with the general intent of the Contract Documents, when the requests are timely, fully documented and properly submitted, and when one or more of the following conditions is satisfied, as judged by the Project Director; otherwise, the request will be returned without action except to record noncompliance with these requirements.

2.2.1.1 The Project Director will consider a request for substitution where the request is directly related to an "or equal" clause or similar language in the Contract Documents.

2.2.1.2 The Project Director will consider a request for substitution where the specified product or method cannot be provided within the Contract Time. However, the request will not be considered if the product or method cannot be provided as a result of the Contractor's failure to furnish adequate

submittals, place orders, or otherwise pursue the work promptly or to coordinate the various activities properly.

2.2.1.3 The Project Director will consider a request for substitution where the specified product or method cannot receive necessary approval by a governing authority, and the requested substitution can be approved. .

2.2.1.4 The Project Director will consider a request for a substitution where a substantial advantage is offered to the Government, in terms of cost, time, performance, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Government may be required to bear. These additional responsibilities may include such considerations as additional compensation to the Contractor for redesign and evaluation services, the increased cost of other work by the Government or separate Contractors, cost of special testing to meet Government criteria, and similar considerations.

2.2.1.5 The Project Director will consider a request for substitution when the specified product or method cannot be provided in a manner which is compatible with other materials of the work, and where the Contractor certifies that the substitution will overcome the incompatibility.

2.2.1.6 The Project Director will consider a request for substitution when the specified products or method cannot be properly coordinated with other materials in the work, and where the Contractor certifies that the proposed substitution can be properly coordinated.

2.2.1.7 The Project Director will consider a request for substitution when the specified product or method cannot receive a warranty as required by the Contract Documents and where the Contractor certifies that the proposed substitution will bear the required warranty.

2.2.1.8 The Project Director will consider a request for substitution when a Life Cycle Costing Analysis is submitted by the Contractor for the substitution which indicates that the substitution will meet the design criteria, will be of benefit to the Government and will cost less than or no more than the product specified.

2.2.2 Work Related Submittals: The Contractor's submittal of and the Project Director's acceptance of shop drawings, product data or samples which relate to work not complying with requirements of the Contract Documents does not constitute an acceptable or valid request for a substitution, nor can it be interpreted as the Project Director's approval thereof.

2.3 GENERAL PRODUCT REQUIREMENTS:

2.3.1 Provide products that comply with the requirements of the Contract Documents and that are undamaged and, un-less otherwise permitted, unused at the time of installation. Provide products that are complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

2.3.1.1 Standard Products: Where they are available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

2.3.1.2 Continued Availability: Where, because of the nature of its application, the Government is likely to need replacement parts or additional amounts of a product at a later date, either for maintenance and repair or replacement, provide standard, domestically produced products for which the manufacturer has published assurances that the products and its parts will be available to the Government at a later date.

2.3.2 Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.

2.3.3 Equipment Data plates: Provide a permanent nameplate on each item or product which consists of moving parts or which is likely to require service, replacement elements, testing, and other care and; in any case, service connected or power operated equipment. Locate the data plate on an easily accessible surface which is inconspicuous in regularly occupied spaces. The data plate shall contain the following information and other essential operating data:

A. Name of manufacturer
B. Date of Delivery, Manufacturer or Installation
C. Name of product
D. Model number
E. Serial number
F. Other Control Numbers of Identifications
G. Capacity
H. Speed
I. Rating and other data relevant to replacement of future modifications.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS:

3.1.1 Except as otherwise indicated in individual sections of these specifications, comply with the manufacturer's instructions and recommendations for installation of the products in the applications indicated.

END OF SECTION 01631

SECTION 01700 - PROJECT COMPLETION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Contract Drawings and general provisions of the Contract, including the Contract Clauses and Conditions, the Supplementary Clauses and Conditions and other Division 1 Specification Sections.

1.2 DELETED

1.3 PREREQUISITES TO SUBSTANTIAL COMPLETION:

1.3.1 The Contractor shall complete the items listed below before requesting the Project Director's inspection for certification of Substantial Completion. In the request, all known exceptions to Substantial Completion must be listed individually. Requests for partial inspections and partial acceptance of Substantial Completion for fractions of contractual work lesser than a complete phase will not be considered. .

1.3.1.1 In the Progress Payment Request that coincides with, or is the first request following, the date Substantial Completion is claimed, the Contractor should either show 100% completion or list incomplete items, the value of incomplete work and reasons for the work being incomplete.

1.3.1.2 Submit a statement showing an accounting of changes to the Contract Price.

1.3.1.3 Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.

1.3.1.4 Obtain and submit releases enabling the Government's full, unrestricted use of the work and access to services and utilities. Where required, include occupancy permits, operating certificates and similar releases.

1.3.1.5 Submit record drawings (As-Builts), maintenance manuals, final project photographs, damage or settlement survey, property survey, and similar final record information.

1.3.1.6 Deliver tools, spare parts, extra stock of material and similar physical items to the Project Director.

1.3.1.7 Make the final changeover of locks and transmit the keys to the Project Director. Advise the Government's personnel of the changeover in security provisions.

1.3.1.8 Complete final cleaning up requirements.

1.3.1.9 Touch up and otherwise repair and restore marred exposed finishes.

1.3.2 Inspection Procedures: Upon receipt of the . Contractor's request for inspection, the Project Director will either proceed with inspection or advise the Contractor of unfilled prerequisites.

1.3.2.1. Following the initial inspection, the Project Director will either prepare the Certificate of Substantial Completion, or will advise the Contractor of work which must be performed before the certificate will

be issued. The Project Director will repeat the inspection when requested after the Contractor has certified that the deficient or incomplete work has been substantially completed.

1.3.2.2 Results of the complete inspection will form the initial ~punch list" for final acceptance.

1.4 PREREQUISITES TO FINAL ACCEPTANCE:

1.4.1 Final Inspection and Tests: The Contractor shall give the Project Director at least 15 days advance written notice of the date the work will be fully completed and ready for final inspection and tests. Refer to "Final Inspection and Tests" in Contract Clauses and Conditions, DS 1231, for additional requirements. Complete the start-up and testing of all systems and instruction of the Government's operating and maintenance personnel. Discontinue or change over and remove all temporary facilities and services from the area of the project site, to be occupied by the Government, along with construction tools and facilities, mock-ups, and similar elements.

1.4.2 General: Complete the following activities before requesting the Project Director's final inspection for Certification of Final Acceptance, and final payment as required by the General Conditions. List known exceptions, if any, in the request.

1.4.2.1 Submit the final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

1.4.2.2 Submit an updated final statement, accounting for final additional changes to the Contract Price.

1.4.2.3 Submit a certified copy of the Project Director's final punch list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and has been endorsed and dated by the Project Director.

1.4.2.4 Deleted

1.4.2.5 Deleted

1.4.2.6 Submit a final liquidated damages settlement statement, acceptable to the Government.

1.4.3 Reinspection Procedure: The Project Director will reinspect the work upon receipt of the Contractor's notice that the work, including punch list items resulting from earlier inspections, has been completed, except for those items whose completion has been delayed because of circumstances that are in the Project Director's written opinion, beyond the control of the Contractor. ,

1.4.3.1 Upon completion of reinspection, the Project Director will either prepare a Certificate of Final Acceptance, or will advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

1.4.3.2 If necessary, the reinspection procedure will be repeated. ,

1.4.4 Submit evidence of final, continuing insurance coverage complying with insurance requirements.

1.5 RECORD DOCUMENT SUBMITTALS:

1.5.1 General: Specific requirements for record documents are indicated in the individual sections. of these specifications. Other requirements are indicated in Contract Clauses and Conditions, DS 1231, under

the headings “Record Documents” and “As—Built Documents”, General submittal requirements are indicated in the ‘ various “submittals” sections.

1.5.1.1 Do not use Record Documents for construction purposes; protect from deterioration and loss in a secure, fire-resistant location; provide access to record documents for the Project Director’s reference during normal working hours. ‘

1.5.2 Record Specifications: Maintain one complete copy of the Project Manual, including specifications and addenda, and one copy of other written Contract Documents such as change orders and similar modifications issued in printed form during construction. Mark these documents to show substantial variations in the actual work performed in comparison with the text of the specifications and modifications as issued. Give particular attention to substitutions, selection of options and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing’ information and product data, where applicable.

1.5.2.1 Upon completion of the work, submit record specifications to the Project Director for the Government’ s records.

1.5.3 Record Product Data: Maintain one copy of each product data submittal. Mark these documents to show significant variations in the actual work performed in comparison with the submitted information. Include both variations in the products as delivered to the site, and variations from the manufacturer’s instructions and recommendations for installation. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned at a later date by direct observation. Note related change orders and markup, submit complete, bound sets of record product data to the Project Director for the Government’s records.

1.5.3.1 Prepare three bound product books providing the complete data on the product used, such as model number, color, etc., the supplier’s and manufacturer’s and supplier’s names, addresses, telephone and telex numbers. These volumes shall be titled “Replacement Products Procurement Manual.”

1.5.4 Miscellaneous Record Submittals: Refer to other sections of these specifications for requirements of miscellaneous record keeping and submittals in connection with the actual performance of the Work. Immediately prior to the date or dates of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Project Director for the Government’s records.

1.5.5 Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Bind data into individual binders properly identified and indexed. Bind each set of data in a heavy-duty two-inch, three-ring vinyl covered binder, with pocket folders for folded sheet information. Mark the appropriate identification on both front and spine of each binder.

1.5.6 Include the following types of information in operation and maintenance manuals:

A. Emergency instructions
B. Spare parts listing
C. Copies of warranties
D. Wiring diagrams
E. Recommended “turnaround: cycles
F. Inspection procedures
G. Shop drawings and product data

1.5.7 Not Used.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PROCEDURES:

3.1.1 General Operating and Maintenance Instructions: Arrange for each installer of operating equipment and other work that requires regular or continuing maintenance to meet at the site with the Government's personnel to provide necessary basic instruction in the proper operation and maintenance of the entire Work. Where installers are not experienced in the required procedures, include instruction by the manufacturer's representatives. As part of this instruction, provide a detailed review of the following items:

A. Replacement Products Procurement Manual
B. Maintenance manuals
C. Record documents
D. Spare parts and materials
E. Tools
F. Lubricants
G. Fuels
H. Identification systems
I. Control sequences .
J. Hazards .
K. Cleaning
L. Warranties, bonds, maintenance agreements and similar continuing commitments.

As part of this instruction for operating equipment, demonstrate the following procedures:

A. Start-up
B. Shutdown
C. Emergency operations
D. Noise and vibration adjustments
E. Safety procedures
F. Economy and efficiency adjustments
G. Effective energy utilization

3.2 FINAL CLEANING:

3.2.1 General: Special cleaning requirements for specific units of Work are included in the appropriate sections of Divisions 2 through 16. General Cleaning during the regular progress and at completion of the Work is required by the Contract Clauses and Conditions and is expanded in the following paragraphs.

3.2.2 Cleaning: Provide final cleaning of the Work at the appropriate time. Clean each surface or unit of work to the condition expected from a normal, commercial building cleaning and maintenance program. Comply with the manufacturer's instructions for operations.

3.2.3 Complete the following cleaning operations before requesting the Project Director's inspection for certification of substantial completion.

3.2.3.1 Remove labels which are not required as permanent labels. .

3.2.3.2 Clean transparent materials, including mirrors and glass in doors and windows, to a polished condition. Remove putty and other substances which are noticeable as vision obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

3.2.3.3 Clean exposed exterior and interior, hard surfaced finishes to a condition free of dust, stains, films and similar noticeable distracting substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces. Clean, wax and polish hard floor finishes such as wood and vinyl.

3.2.3.4 Wipe surfaces of mechanical and electrical equipment clean. Remove excess lubrication and other substances. Clean and disinfect plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

3.2.3.5 Clean the project site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas to a broom—clean condition; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth even textured surface.

3.2.4 Removal of Protection: Except as otherwise indicated or requested by the Project Director, remove temporary protection devices and facilities which were installed during the course of the work to protect previously complete work during the remainder of the construction period.

3.2.5 Compliance: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at the site. Do not bury debris or excess materials on the Embassy property. Do not discharge volatile or other harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

3.2.6 Where extra materials of value remain after completion of associated work, dispose of these materials to the Government's best advantage as directed by Contract Clauses and Conditions article entitled "Surplus Materials".

3.1.4 The Contractor shall provide a final certification from local authorities (final building permit, occupancy permit, acceptance and sign off) if and when required by local code.

END OF SECTION – 01700.

SECTION 02060 – BUILDING DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Demolition of designated structures and removal of materials from site.

B. Demolition and removal of slabs-on-grade.

C. Disconnecting and removal of identified utilities.

D. Refer to items as indicated.

1.02 RELATED SECTIONS

A. Section 01500 - Construction Facilities and Temporary Controls: Barriers, fences, landscape protection and dust control.

B. Section 01600 - Material and Equipment.

C. Section 01700 - Contract Closeout: Project record documents.

D. Section 02072 - Minor Demolition for Remodeling.

E. Section 02110 - Site Clearing: Clearing outside periphery of structures.

F. Section 02205 - Soil Materials: Backfill materials.

G. Section 02207 - Aggregate Materials: Backfill materials.

1.03 NOT USED

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate demolition and removal sequence and location of salvageable items; location and construction of barricades, fences and temporary work.

1.05 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700.

B. Accurately record actual locations of relocated utilities and subsurface obstructions.

1.06 NOT USED

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for demolition of structures, safety of adjacent structures, dust control, runoff control and disposal.

B. Obtain required permits from authorities.

C. Notify affected utility services before starting work and comply with their requirements.

D. Do not close or obstruct roadways, sidewalks or hydrants without permits.

E. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

F. Test soils around buried tanks for contamination.

1.08 NOT USED

1.09 SCHEDULING

A. Schedule Work so as not to interfere with other ongoing site work.

B. Describe demolition removal procedures and schedule.

PART 2 NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Provide, erect and maintain temporary barriers and security devices at locations as directed.

B. Protect existing landscaping materials, appurtenances and structures which are not to be demolished.

C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring.

D. Mark location of utilities.

3.02 DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent structures and occupancies.

B. Cease operations immediately if adjacent structures appear to be in danger. Notify Contracting Officer. Do not resume operations until directed.

C. Conduct operations with minimum interference to public or private accesses. Maintain protected egress and access at all times.

D. Sprinkle Work with water to minimize dust. Provide hoses and water connections for this purpose.

3.03 DEMOLITION

A. Disconnect and remove designated utilities within demolition areas.

B. Remove concrete slabs on grade.

C. Remove materials to be re-installed or retained in manner to prevent damage. Store and protect in accordance with requirements of Section 01600.

D. Remove demolished materials from site.

E. Do not burn or bury materials on site. Leave site in clean condition.

F. Remove temporary work.

END OF SECTION 02060

SECTION 02072 - MINOR DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Removal of designated building equipment and fixtures.

B. Removal of designated construction.

C. Disposal of materials and Storage of removed materials.

D. Identification of utilities.

E. Refer to items as indicated.

1.02 RELATED SECTIONS

A. Section 01500 - Construction Facilities and Temporary Controls: Temporary enclosures, dust control barricades, security at User occupied areas and cleanup during construction.

B. Section 01700 - Contract Closeout: Project record documents.

1.03 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Shop Drawings: Indicate demolition and removal sequence and location of salvageable items location and construction of temporary work.

1.04 SUBMITTALS FOR CLOSEOUT

A. Section 01700 - Contract Closeout:

B. Project Record Documents: Accurately record actual locations of utilities and subsurface obstructions.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.

B. Obtain required permits from authorities.

C. Do not close or obstruct egress width to any building or site exit.

D. Do not disable or disrupt building fire or life safety systems without 7 days prior written notice to Contracting Officer.

E. Conform to procedures applicable when hazardous or contaminated materials are discovered.

1.06 NOT USED

1.07 SCHEDULING

A. Section 01300 - Submittals.

B. Schedule Work to coincide with new construction and/or new construction.

C. Describe demolition removal procedures and schedule.

D. Perform noisy, malodorous and dusty work:
1. Between the hours of 08:00 and 19:00.

1.08 PROJECT CONDITIONS

A. Conduct demolition to minimize interference with adjacent and occupied building areas.

B. Cease operations immediately if structure appears to be in danger and notify Contracting Officer. Do not resume operations until directed.

PART 2 NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Provide, erect and maintain temporary barriers and insulated partitions at locations indicated.

B. Erect and maintain weatherproof closures for exterior openings.

C. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued User occupancy.

D. Protect existing materials which are not to be demolished.

E. Prevent movement of structure; provide bracing and shoring.

F. Mark location and termination of utilities.

G. Provide appropriate temporary signage including signage for exit or building egress.

3.02 DEMOLITION

A. Disconnect, remove or cap and identify designated utilities within demolition areas.

B. Demolish in an orderly and careful manner. Protect existing supporting structural members.

C. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.

D. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.

E. Remove temporary Work.

END OF SECTION 02072

SECTION 02110 - SITE CLEARING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of surface debris.

B. Removal of paving, curbs, foundations and slabs on grade.

C. Removal of trees, shrubs and other plant life.

D. Topsoil excavation.

1.02 RELATED SECTIONS

A. Section 02060 - Building Demolition.

1.03 REGULATORY REQUIREMENTS

A. Conform to applicable code for environmental requirements, disposal of debris and use of herbicides.

B. Coordinate clearing Work with Contracting Officer.

PART 2 NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Verify that existing plant life designated to remain is tagged or identified.

B. Identify a waste area or salvage area for placing removed materials.

3.02 PROTECTION

A. Locate, identify and protect utilities that remain from damage.

B. Protect trees, plant growth and features designated to remain as final landscaping.

C. Protect bench marks, survey control points and existing structures from damage or displacement.

3.03 CLEARING

A. Clear areas required for access to site and execution of Work.

B. Remove trees and shrubs indicated. Remove stumps and main root ball and surface rock.

C. Clear undergrowth and deadwood, without disturbing subsoil.

D. Apply herbicide to remaining stumps to inhibit growth.

3.04 REMOVAL

A. Remove debris, rock and extracted plant life from site.

B. Remove paving, curbs and foundations as indicated. Neatly saw cut edges at right angle to surface.

C. Excavate and remove underground storage tanks, retaining straps, associated plumbing piping and foundation pad.

3.05 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, re-landscaped or re-graded without mixing with foreign materials.

B. Do not excavate wet topsoil.

C. Stockpile in area designated on site to depth not exceeding 8 feet (2.5 m) and protect from erosion.

D. Remove excess topsoil not intended for reuse, from site.

END OF SECTION 02110

SECTION 02205 - SOIL MATERIALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Subsoil materials.

B. Topsoil materials.

1.02 RELATED SECTIONS

A. Section 01400 - Quality Control.

B. Section 02207 - Aggregate Materials.

C. Section 02223 - Backfilling.

D. Section 02225 - Trenching.

1.04 REFERENCES

A. TS-1500 - Classification of Soils for Civil Engineering Purposes.

B. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

C. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

D. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

E. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

F. ASTM D2487 - Classification of Soils for Engineering Purposes.

G. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

H. ASTM D3017 - Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

I. TS-1900 - Methods of Testing Soils in the Laboratory.

J. TS-1901 - Method of Testing Soils in Place.

K. TS-5744 - In-Situ Measurement of Soils.

1.05 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Samples: Submit, in air-tight containers, 10 lb (4.5 kg) sample of each type of fill to testing laboratory.

1.06 NOT USED

1.07 NOT USED

PART 2 PRODUCTS

2.01 SUBSOIL MATERIALS

A. Satisfactory Materials (Subsoil Type S1): Include materials classified in TS 1500, as GW, GP, SW, GM, SP and SM. For this project Class GC, SC, ML, MH, CL and CH are also satisfactory materials.

B. Unsatisfactory Materials (Subsoil Type S2): Include materials classified in TS 1500, as PT, OL and OH. Replacement of such materials when they are exposed during excavation shall be determined by the Contracting Officer.

C. Cohesive Material: Materials classified in TS 1500 Unified Soil Classification System, as GC, SC, ML, MH and CH are cohesive.

D. Cohesionless Material: Materials classified in TS 1500 Unified Soil Classification System, as GW, GP, SW and SP are cohesionless. Material classified as GM and SM will be identified as cohesionless only when the fines are non plastic.

2.02 TOPSOIL MATERIALS

A. Topsoil Type S3: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth taken from drained site; free of subsoil, clay or impurities, plants weeds and roots; PH value of minimum 5.5 and maximum 7.5.

B. Topsoil Type S4
   1. Excavated and reused material. (Select.) Unclassified.
   2. Graded.
   3. Free of roots, rocks larger than 1/2 inch (12 mm), subsoil, debris, large weeds and foreign matter.
   4. Conforming to TS 1500 Group Symbol OH, PT.

C. Topsoil Type S5:
   1. Imported borrow.
   2. Friable loam.
   3. Reasonably free of roots, rocks larger than 1/2 inch (12 mm), subsoil, debris, large weeds, and foreign matter.
   4. Acidity range (pH) of 5.5 to 7.5.
   5. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.
   6. Conforming to TS 1500 Group Symbol OH, PT

2.03 SOURCE QUALITY CONTROL

A. Section 01400 - Quality Control.

B. Testing and Analysis of Subsoil Material: Perform in accordance with TS 1990, 1901 and TS 5744.

C. Testing and Analysis of Topsoil Material: Perform in accordance with TS 1900, TS 1901 and TS 5744.

D. If tests indicate materials do not meet specified requirements, change material and retest.

E. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 SOIL REMOVAL

A. Excavate subsoil and topsoil from areas designated.

B. Remove lumped soil, boulders and rock.

C. Stockpile excavated material in area designated on site and remove excess material not being used, from site.

3.02 STOCKPILING

A. Stockpile materials on site at locations designated by Contracting Officer.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Prevent intermixing of soil types or contamination.

E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.03 STOCKPILE CLEANUP

A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

B. If a borrow area is indicated; leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION 02205

SECTION 02207 - AGGREGATE MATERIALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate materials.

1.02 RELATED SECTIONS

A. Section 01400-Quality Control, Section 01410-Testing Laboratory Services: Testing aggregate fill materials.

B. Section 02205 - Soil Materials.

C. Section 02223 - Backfilling.

D. Section 02225 - Trenching.

E. Section 02231 - Aggregate Base Course.

1.03 REFERENCES

A. TS-130 - Sieve Analysis of Fine and Coarse Aggregates.

B TS-706 - Concrete Aggregates.

C. TS-1225 - Grain Size for Designating Size Categories of Particle Materials

D. TS-1227 - Metal Wire Screens for Testing Sieves

E. TS-1500 - Classification of Soils for Civil Engineering Purposes.

F. TS-1900 - Methods of Testing Soils.

G. TS-3821 - Acceptability Testing-Aggregates.

H. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.

I. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

J. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

K. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

L. ASTM D2487 - Classification of Soils for Engineering Purposes.

M. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

N. ASTM D3017 - Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

O. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Samples: Submit, in air-tight containers, 10 lb (4.5 kg) sample of each type of fill to testing laboratory.

1.05 NOT USED

1.06 NOT USED

PART 2 PRODUCTS

2.01 COARSE AGGREGATE MATERIALS

A. Coarse Aggregate Type A1: Shall consist of clean, sound, durable particles of crushed stone, free of silt and clay, vegetable matter and other objectionable materials or coatings. The portion retained on the No. 4 sieves.

B. Coarse Aggregate Type A2 (Gravel): Grade, Sieve size 1.5 inch (38 mm) - No.200 (75 micron); passing the No. 4 (4.75 mm) sieve with a liquid limit of not more than 25; a plasticity index of not more than 5.

C. Coarse Aggregate Type A3 (Crushed Stone): Angular free of shale, clay, friable material and debris; graded within the following limits:

Sieve Size	Percent Passing
2 inches (50 mm)	100
1 inch (25 mm)	95
3/4 inch (19 mm)	95 to 100
5/8 inch (16 mm)	75 to 100
3/8 inch (9 mm)	55 to 85
No. 4 (4.75 mm)	35 to 60
No. 16 (1.18 mm)	15 to 35
No. 40 (450 micro m)	10 to 25
No. 200 (75 micro m)	5 to 10

D. Aggregate Type A4 (Pea Gravel): Natural stone; washed, free of clay, shale, organic matter; graded in accordance with specifications; Group Symbol GM, GC; to the following limits:

1. Minimum Size: 1/4 inch (6 mm)
2. Maximum Size: 5/8 inch (16 mm)

2.02 FINE AGGREGATE MATERIALS

A. Fine Aggregate Type A5 : Shall be angular particles produced by crushed stone, finer than No. 4 sieve.

B. Fine Aggregate Type A6 (Sand): Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter; graded in accordance with specifications Group Symbol SW, SP, SM, SC; within the following limits:

Sieve Size		Percent Passing
No.	4 (4.75 mm)	100
No.	14 (1.40 mm)	10 to 100
No.	50 (300 micro m)	5 to 90
No.	100 (150 micro m)	4 to 30
No.	200 (75 micro m)	0

2.03 SOURCE QUALITY CONTROL

A. Section 01400 - Quality Control: Source testing and analysis of aggregate material.

B. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with specifications.

C. Fine Aggregate Material - Testing and Analysis: Perform in accordance with specifications.

D. If tests indicate materials do not meet specified requirements, change material or material source and retest.

E. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 STOCKPILING

A. Stockpile materials on site at locations designated by Contracting Officer.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Direct surface water away from stockpile site so as to prevent erosion or deterioration of materials.

3.02 STOCKPILE CLEANUP

A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

B. If a borrow area is indicated; leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION 02207

SECTION 02222 - EXCAVATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for site structures.

B. Excavating for slabs-on-grade, paving and landscaping.

C. Excavating for site structures.

1.02 RELATED SECTIONS

A. Section 01400 - Quality Control: Inspection of bearing surfaces.

B. Section 01500 - Construction Facilities and Temporary Controls: Dewatering of excavations and water control.

C. Section 02223 - Backfilling.

D. Section 02225 - Trenching: Excavating for utility trenches.

1.03 FIELD MEASUREMENTS

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

PART 2 NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours and datum locations.

B. Locate, identify and protect utilities that remain from damage.

C. Protect plant life, lawns, rock outcroppings and other features remaining as a portion of final landscaping.

D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving and curbs from excavating equipment and vehicular traffic.

3.02 EXCAVATING

A. Underpin adjacent structures which may be damaged by excavating work.

B. Excavate subsoil to accommodate building foundations, slabs-on-grade, paving and site structures.

C. Excavate to working elevations for piling work.

D. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with Section 02223

E. Slope banks with machine to angle of repose or less until shored.

F. Do not interfere with 45 degree bearing splay of foundations.

G. Grade top perimeter of excavating to prevent surface water from draining into excavation.

H. Hand trim excavation. Remove loose matter.

I. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd (0.25 cu m) measured by volume.

J. Notify Contracting Officer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

K. Correct areas over excavated in accordance with Section 02223.

L. Stockpile excavated material in area designated on site in accordance with Section 02205 and 02207; remove excess or unsuitable material from site.

3.03 SHORING

A. Shoring shall be required whenever a hole exceeds 1.5 meter in depth and the sides can not be adequately sloped back (minimum 2:1 slope), or if the sides are highly unstable.

B. Shoring shall be solid (wood or metal) across the sides of the excavation.

C. Shoring shall be braced using solid, high quality members (i.e. 4 inch by 4 inch wood or 4 inch dia, steel tubing) firmly fixed against the opposite wall of the excavation, or fixed to the ground on the "excavation side."

D. Shoring bracing shall be laid out in a grid type pattern not to exceed 1 meter by 1 meter spacing. Bracing may need to be increased if the excavation is very deep or if the soil is unstable.

3.04 FIELD QUALITY CONTROL

A. Section 01400 - Quality Assurance: Field inspection and testing.

B. Provide for visual inspection of bearing surfaces.

3.05 PROTECTION

A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION 02222

SECTION 02223 - BACKFILLING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building perimeter and site structure backfilling to subgrade elevations.

B. Site filling and backfilling.

C. Fill under slabs-on-grade and paving.

D. Fill for over-excavation.

E. Consolidation and compaction as scheduled.

1.02 RELATED SECTIONS

A. Section 01400 - Quality Control.

B. Section 02205 - Soil Materials.

C. Section 02207 - Aggregate Materials.

D. Section 02222 - Excavating.

E. Section 02225 - Trenching: Backfilling of utility trenches.

F. Section 03300 - Cast-in-Place Concrete: Concrete materials.

1.03 REFERENCES

A. TS-1900 - Methods of Soil Testing.

B. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

C. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

D. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

E. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

F. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

G. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

H. TS-1500 - Classification of Soils For Civil Engineering Purposes.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. Fill Type: As specified in Section 02205/02207.

B. Structural Fill Type: As specified in Section 02205/02207.

C. Concrete: Structural concrete conforming to Section 03300 with compressive strength of 300 kg/sq. cm.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

B. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.

C. Verify structural ability of unsupported walls to support imposed loads by the fill.

3.02 PREPARATION

A. Compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill and compact to density equal to or greater than requirements for subsequent fill material.

C. Scarify and proof roll subgrade surface to a depth of 10 inch (304.8 mm) to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.03 BACKFILLING

A. Backfill areas to contours and elevations with unfrozen materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

C. Granular Fill: Place and compact materials in equal continuous layers not exceeding 8 inches 200 mm. compacted depth.

D. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches 200 mm. compacted depth.

E. Employ a placement method that does not disturb or damage other work.

F. Maintain optimum moisture content of backfill materials to attain required compaction density.

G. Do not backfill against unsupported foundation walls.

H. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

I. Slope grade away from building minimum 2 inches in 10 ft (50 mm in 3 m), unless noted otherwise.

J. Make gradual grade changes. Blend slope into level areas.

K. Remove surplus backfill materials from site.

L. Leave fill material stockpile areas free of excess fill materials.

3.04 TOLERANCES

A. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch (25 mm) from required elevations.

B. Top Surface of General Backfilling: Plus or minus 1 inch (25 mm) from required elevations.

3.05 FIELD QUALITY CONTROL

A. Section 01400 - Quality Assurance: Field inspection and testing.

B. Compaction testing will be performed in accordance with specifications.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

D. Frequency of Tests: As requested by The Contracting Officer

E. Proof roll compacted fill surfaces under slabs-on-grade, pavers, paving.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Reshape and re-compact fills subjected to vehicular traffic.

END OF SECTION 02223

SECTION 02225 - TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating trenches for utilities from 5 feet (1.5 m) outside building to utilities.

B. Compacted fill from top of utility bedding to subgrade elevations.

C. Backfilling and compaction.

1.02 RELATED SECTIONS

A. Section 01400 - Quality Control, Section 01410 - Testing Laboratory Services: Testing fill compaction.

B. Section 01420 - Safety.

C. Section 01500 - Construction Facilities and Temporary Controls: Water control in excavations.

D. Section 02205 - Soil Materials.

E. Section 02207 - Aggregate Materials.

F. Section 02222 - Excavating: General building excavation.

G. Section 02223 - Backfilling: General backfilling.

H. Section 03300 - Cast-in-Place Concrete: Concrete materials.

I. Section 16111 - Conduit.

J. Section 16123 - Building Wire and Cable.

1.03 REFERENCES

A. TS-1900 - Methods of Testing Soils.

B. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.

C. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

D. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

E. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

F. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

G. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

H. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

I. TS-3821 - Acceptability Testing-Aggregates.

J. TS-130 - Sieve Analysis of Fine and Coarse Aggregates.

K. TS-5744 - In-Situ Soil Measurement Methods.

L. EM385-1-1 - Safety and Health Requirements Manual.

1.04 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit or cable.

1.05 FIELD MEASUREMENTS

A. Verify that survey bench mark, control point and intended elevations for the Work are as shown on drawings.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. Fill Type S1: As specified in Section 02205.

B. Structural Fill Type: As specified in Section 02207.

C. Concrete: Structural concrete conforming to Section 03300 with a compressive strength of 300 kg/sq cm.

PART 3 EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours and datum locations.

B. Protect plant life, lawns and other features remaining as a portion of final landscaping.

C. Protect bench marks, existing structures, fences, sidewalks, paving and curbs from excavating equipment and vehicular traffic.

D. Maintain and protect above and below grade utilities which are to remain.

E. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type S1 and compact to density equal to or greater than requirements for subsequent backfill material.

3.02 SHORING

A. Shoring shall be required whenever a trench exceeds 1.5 meter in depth and the sides can not be adequately sloped back (minimum 2:1 slope), or if the sides are highly unstable (i.e. in sand).

B. Shoring shall be solid (wood or metal) across the sides of the trench wall.

C. Shoring shall be braced using solid, high quality members (i.e. 4 inch by 4 inch wood or 4 inch dia., steel tubing) firmly fixed against the opposite wall of the trench.

D. Shoring bracing shall be laid out in a grid type pattern not to exceed 1 meter by 1 meter spacing. Bracing may need to be increased if the trench is very deep or if the soil is unstable.

3.03 EXCAVATING

A. Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.

B. Do not interfere with 45 degree bearing splay of foundations.

C. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

D. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd (0.25 cu m), measured by volume. Larger material will be removed under selection.

E. Correct areas over excavated in accordance with Section 02222.

F. Stockpile excavated material in area designated on site and remove excess material not being used, from site.

3.04 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen fill materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Granular Fill Type A: Place and compact materials in equal continuous layers not exceeding 8 inches (200 mm) compacted depth.

D. Soil Fill Type S: Place and compact material in equal continuous layers not exceeding 10 inches (250 mm) compacted depth.

E. Employ a placement method that does not disturb or damage foundation perimeter drainage and utilities in trench.

F. Maintain optimum moisture content of fill materials to attain required compaction density.

G. Remove surplus fill materials from site.

H. Leave fill material stockpile areas completely free of excess fill materials.

3.05 TOLERANCES

A. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch (25 mm) from required elevations.

B. Top Surface of General Backfilling: Plus or minus 1 inch (25 mm) from required elevations.

3.06 FIELD QUALITY CONTROL

A. Section 01400 - Quality Assurance: Field inspection and testing.

B. Compaction testing will be performed in accordance with specifications.

C. If tests indicate Work does not meet specified requirements, remove Work, replace, compact and retest.

D. Frequency of Tests: Every lift.

3.07 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Reshape and re-compact fills subjected to vehicular traffic during construction.

END OF SECTION 02225

SECTION 02231 - AGGREGATE BASE COURSE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

1.02 RELATED SECTIONS

A. Section 01400 - Quality Control: Inspection of bearing surfaces.

B. Section 02207 - Aggregate Materials.

C. Section 02223 - Backfilling: Compacted fill under base course.

D. Section 02225 - Trenching: Compacted fill under base course.

1.03 REFERENCES

A. TS-1900 - Methods of Testing Soils.

B. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

C. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

D. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

E. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

F. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

PART 2 PRODUCTS

2.01 MATERIALS

A. Coarse Aggregate Fill Type A1: As specified in Section 02207.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify substrate has been inspected, gradients and elevations are correct, and are dry.

3.02 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place fill on soft, muddy or frozen surfaces.

3.03 AGGREGATE PLACEMENT

A. Place aggregate in maximum 8 inch (200 mm) layers and roller compact to specified density.

B. Level and contour surfaces to elevations and gradients indicated.

C. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch (6 mm) measured with 10 foot (3 m) straight edge.

B. Scheduled Compacted Thickness: Within 1/2 inch (13 mm).

C. Variation From Design Elevation: Within 1/2 inch (12 mm).

3.05 FIELD QUALITY CONTROL

A. Section 01400 - Quality Assurance: Field inspection.

B. Compaction testing will be performed in accordance with specifications.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

D. Frequency of Tests: Each lift.

END OF SECTION 02231

SECTION 03100 - CONCRETE FORMWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in place concrete with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.02 RELATED SECTIONS

A. Section 03200 - Concrete Reinforcement.

B. Section 03300 - Cast-in-Place Concrete.

1.03 REFERENCES

A. TS-500 - Building Code Requirements for Reinforced Concrete..

B. TS-3233 - Building code requirements for Prestressed Concrete..

C. TS-4645 - Plywood-Exterior Use.

D. ASME A17.1 - Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks

E. TS-4520 - Plywood for Building Purposes.

1.04 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.05 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

C. Product Data: Provide data on void form materials and installation requirements.

PART 2 PRODUCTS

2.01 WOOD FORM MATERIALS

A. Plywood: Douglas Fir species; solid one side; sound undamaged sheets with clean, true edges.

B. Lumber: Pine species with grade stamp clearly visible.

2.02 PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gage (1.5 mm) matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

2.03 FORMWORK ACCESSORIES

A. Form Ties: Removable or Snap-off type, galvanized metal, adjustable length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch (25 mm) in concrete surface.

B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture , or impair natural bonding or color characteristics of coating intended for use on concrete.

C. Corners: Chamfered, wood strip type, size as specified on drawings.

D. Dovetail Anchor Slot: Galvanized steel, 22 gage (0.8 mm) thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

E. Flashing Reglets: Rigid PVC, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

G. Waterstops: Rubber, minimum 1,750 psi (12 MPa) tensile strength, minimum 50 degrees F (46 degrees C) to plus 175 degrees F (79 degrees C) working temperature range, ribbed profile, preformed corner sections, heat welded jointing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Earth forms are not permitted.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with specifications.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members which are not indicated on Drawings.

F. Provide chamfer strips on external corners of beams, joists and columns.

G. Coordinate this section with other sections of work which require attachment of components to formwork.

H. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Contracting Officer.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are effected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items which will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

D. Position recessed reglets for brick veneer masonry anchors to spacing and intervals specified in Section 04300.

E. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.

F. Install waterstops in accordance with manufacturer's instructions continuous without displacing reinforcement. Heat seal joints watertight.

G. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

H. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by specifications.
B. Construct and align formwork for elevator hoistway in accordance with specifications.
C. Camber slabs and beams 1/4 inch per 10 feet (2 mm/m).

3.08 FIELD QUALITY CONTROL

A. Section 01400 - Quality Control: Field inspection and testing.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

C. Do not reuse wood formwork more than three times for concrete surfaces to be exposed to view. Do not patch formwork.

3.09 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

END OF SECTION 03100

SECTION 03200 - CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.

1.02 RELATED SECTIONS

A. Section 03100 - Concrete Formwork.

B Section 03300 - Cast-in-Place Concrete.

C. Section 03346 - Concrete Floor Finishing: Reinforcement for concrete floor toppings.

1.03 REFERENCES

A. TS-500 - Building Code Requirements for Reinforced Concrete.

B. TS-3233 - Building code Requirements for Prestressed Concrete.

C. TS-3271 - Steel Wires for Prestressed Concrete.

D. ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.

E. ASTM A184 - Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.

F. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

G. ASTM A496 - Deformed Steel Wire Fabric for Concrete Reinforcement.

H. ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

I. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

J. ASTM A616 - Rail Steel Deformed and Plain Bars for Concrete Reinforcement.

K. ASTM A617 - Axle Steel Deformed and Plain Bars for Concrete Reinforcement.

L. ASTM A704 - Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.

M. ASTM A706 - Low-Alloy Steel Deformed Bars for Concrete Reinforcement.

N. ASTM A767 - Zinc-Coated (Galvanized) Bars for Concrete Reinforcement.

O. ASTM A775 - Epoxy-Coated Reinforcing Steel Bars.

P. ASTM D3963 - Epoxy-Coated Reinforcing Steel.

Q. TS-708 - Steel Bars for Concrete.

R. TS-6868 - Qualification Testing of Welders.

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Shop Drawings: Indicate bar sizes, spacings, locations and quantities of reinforcing steel and wire fabric, bending and cutting schedules and supporting and spacing devices.

1.05 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Procedures for submittals.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: 414 Mpa yield grade; deformed billet steel bars, unfinished.

B. Reinforcing Steel Mat: 414 Mpa yield grade; steel bars or rods, unfinished.

C. Stirrup Steel: unfinished.

D. Welded Steel Wire Fabric: Welded Deformed Type; in flat sheets, unfinished.

2.02 ACCESSORIES

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic or steel type; size and shape as required.

2.03 FABRICATION

A. Fabricate concrete reinforcing in accordance with specifications.

B. Weld reinforcement in accordance with specified standards.

C. Locate reinforcing splices not indicated on drawings, at point of minimum stress. Review location of splices with Contracting Officer.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Maintain minimum concrete cover around reinforcing as follows:

Item	Coverage
Beams	1 inch (25 mm)
Supported Slabs and Joists	1 inch (25 mm)
Column Ties	1 inch (25 mm)
Walls (exposed to weather or backfill)	2 inch (50 mm)
Footings and Concrete Formed Against Earth	2 inch (50 mm)
Slabs on Fill	2 inch (50 mm)

E. Bond and ground all reinforcement to requirements of selection.

3.02 FIELD QUALITY CONTROL

A. Section 01400 - Quality Control: Field inspection and testing.

END OF SECTION 03200

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Cast-in-place concrete, building frame members, floors shear walls, elevator shaft walls, foundation walls and supported slabs.

B. Floors and slabs on grade.

C. Control, expansion and contraction joint devices associated with concrete work, including joint sealants.

D. Equipment pads, light pole base, flagpole base, thrust blocks, manholes.

1.02 RELATED SECTIONS

A. Section 03100 - Concrete Formwork: Formwork and accessories.

B. Section 03200 - Concrete Reinforcement.

C. Section 03370 - Concrete Curing.

D. Section 07900 - Joint Sealers.

1.03 REFERENCES

A. TS-500 - Building Code requirements for Reinforced Concrete.
B. TS-2511 - Mix Design for Structural Lightweight Concrete.
C. TS-3233 - Building Code requirements for Prestressed Concrete..
D. TS-4047 - Reinforced Lightweight Concrete floor and roof Plates.
E. TS-1247 - Mixing, Placing and Curing of Concrete. (Normal Weather Conditions)
F. TS-1248 - Mixing, Placing and Curing of Concrete. (Abnormal Weather Conditions)
G. TS-706 - Aggregate for Concrete.
H. TS-3452 - Chemical Admixtures for Concrete.
I. ACI 318 - Building Code Requirements for Reinforced Concrete.
J. TS- 2871- Measuring the consistency of concrete By The Method of Slump Test.
K. TS- 3114- Determination of compressive strength of concrete Tests Specimens.
L. TS- 3260- Determination of compressive strength of Concrete by Surface Hardness Method.
M. TS- 2440- Methods of sampling Fresh Concrete.
N. TS- 2518- Cement content of Hardened Portland Cement .Concrete
O. TS- 3456- Air Entraining Admixtures of Concrete.
P. TS-.3286- Flexural Strength of Concrete Under Field Conditions.
R. TS- 802- Design Concrete Mixes.
S. TS- 3440- Rules of Making Concrete Exposed to Aggressive Effects of Liquids, Soils and Gasses.
T. TS- 3624- Test Method of Determination the specific Gravity the Absorption Water and the Void Ratio in Hardened Concrete.
U. TS- 11222- Concrete-Ready Mixed Concrete.
V. TS- 5105- Reinforced Concrete Fence Posts.
Y. TS- 997- Concrete Poles (for Electrical Transmission.)

Z. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
A1. ASTM C33 - Concrete Aggregates.
B1. ASTM C94 - Ready-Mixed Concrete.
C1. ASTM C150 - Portland Cement.
D1. ASTM C260 - Air Entraining Admixtures for Concrete.
E1. ASTM C330 - Light Weight Aggregates For Structural Concrete.
F1. ASTM C494 - Chemical Admixtures for Concrete.
G1. ASTM C618 - Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
H1. ASTM C948 - Test Method for Dry and Wet Bulk Density, Water Absorption and Apparent Porosity of Thin Sections of Glass-Fiber-Reinforced Concrete.
I1. ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).
J1. ASTM D1190 - Concrete Joint Sealer, Hot-Poured Elastic Type.
K1. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
L1. ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
M1 TS-1091-Concrete Joint Sealer Hot Poured Elastic Type.
N1 TS-1094-Jet-Fuel Resistant Concrete Joint Sealer, Hot Poured, Elastic Type.
01 TS-2810-Jointing Materials for Construction and Expansion Joints in concrete work.-Rubber Water Stops.
P1 TS-5892-Building Construction-Jointing Producs-Sealants-Vocabulary.

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide data on joint devices, attachment accessories, admixtures etc.

C. Samples: Submit as specified in Section 01300, AF Form 66.

1.05 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Procedures for submittals.

B. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent Work.

1.06 SUBMITTALS AT PROJECT CLOSEOUT

A. Section 01730 - Operation and Maintenance Data.

B. Accurately record actual locations of embedded utilities and components which are concealed from view.

1.07 MOCK-UP

A. Section 01400 - Quality Control: Requirements for mock-up.

B. Construct and erect a field sample for architectural concrete surfaces receiving special treatment or finish as result of formwork.

C. Sample Panel: Construct two panels, 4 feet (1.20 m) long by 3 feet (.90 m) wide, to indicate special treatment or finish required.

D. If requested by Contracting Officer, cast concrete against sample panel. Obtain acceptance of resultant surface finish prior to erecting formwork.

E. Accepted sample panel is considered basis of quality for the finished work. Keep sample panel exposed to view for duration of concrete work.

F. Locate where directed by The Contracting Officer.

G. Mock-up might remain as part of the Work.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: Portland Cement TS-19,

B. Fine and Coarse Aggregates: TS-706.

C. Water: Clean and not detrimental to concrete.

2.02 ADMIXTURES

A. Air Entrainment: Apply TS-3456.

B. Chemical: Apply TS-3452

2.03 ACCESSORIES

A. Bonding Agent: Non-solvent two component polysulfide epoxy.

B. Vapor Retarder: 6 mil (0.5mm) thick clear polyethylene film or fabric reinforced plastic film for below grade application.

C. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi (17 MPa) in 48 hours and 7,000 psi (48 MPa) in 28 days.

2.04 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler- Type A: Asphalt impregnated fiberboard or felt, Dimensions as indicated on drawings, tongue and groove profile.

B. Joint Filler-Type B: Closed cell (polyvinyl chloride), (molded vinyl) foam, resiliency recovery of 95 percent if not compressed more than 50 percent of original thickness.

C. Joint Filler- Type C: Premolded sponge rubber fully compressible with recovery rate of minimum 95 percent.

D. Construction Joint Devices: Integral (galvanized steel), (extruded plastic), Dimensions as indicated, formed to tongue and groove profile, with removable top strip exposing sealant trough, knockout holes spaced at 6 inches (150 mm), ribbed steel spikes with tongue to fit top screed edge.

E. Expansion and Contraction Joint Devices: alloy, extruded aluminum; resilient, elastomeric, vinyl, neoprene filler strip to permit plus or minus 25 percent joint movement with full recovery; extruded aluminum or vinyl cover plate, of longest manufactured length at each location, flush or recessed mounted; color as selected.

F. Sealant: Hot applied asphalt compound; Apply TS1091

2.05 CONCRETE MIX

A. Mix and deliver concrete in accordance with TS-802 and TS-1247 specifications.

B. Select proportions for normal weight concrete in accordance with TS-802 specifications.

C. Provide concrete to the following criteria:

Unit	Measurement
Compressive Strength (28 day)	3500 psi (25 MPa)
Coarse Aggregate	Apply TS706
Fine Aggregate	Apply TS706
Water/Cement Ratio (maximum)	26Liter/50kg
Aggregate Size (maximum)	1-1/2 inch (38.1 mm)
Aggregate Size (minimum)	Sieve No:100-0.149 mm
Air Entrained	4.5 percent
Admixture	Apply TS-3452 and TS-3456
Slump	2,2-3/4inches 5-7cm

D. Use accelerating admixtures in cold weather only when approved by Contracting Officer. Use of admixtures will not relax cold weather placement requirements.

E. Use calcium chloride only when approved by Contracting Officer.

F. Use set retarding admixtures during hot weather only when approved by Contracting Officer.

G. Add air entraining agent to normal weight concrete mix for work exposed to exterior.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify site conditions prior to commencing work.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.02 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

B. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

C. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

3.03 PLACING CONCRETE

A. Place concrete in accordance with specifications.

B. Notify Contracting Officer minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

D. Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches (150 mm) and seal watertight by sealant applied between overlapping edges and ends.

E. Repair vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches (150 mm) and seal watertight.

F. Separate slabs on grade from vertical surfaces with indicated thick joint filler.

G. Place joint filler as shown on the drawing.

H. Extend joint filler from bottom of slab to within shown dimension of finished slab surface. Conform to Section 07900 for finish joint sealer requirements.

I. Install joint devices in accordance with manufacturer's instructions.

J. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

K. Install joint device anchors. Maintain correct position to allow joint cover to be flush with floor and wall finish.

L. Install joint covers in length, when adjacent construction activity is complete.

M. Apply sealants in joint devices in accordance with Section 07900.

N. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

O. Place concrete continuously between predetermined expansion, control and construction joints.

P. Do not interrupt successive placement; do not permit cold joints to occur.

Q. Place floor slabs in checkerboard or saw cut pattern indicated.

R. Saw cut joints within 24 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.

S. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/4 inch in 10 ft 6 mm/3m.

3.04 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

B. Place required dividers edge strips reinforcing and other items to be cast in.

C. Apply bonding agent to substrate in accordance with manufacturer's instructions.

D. Place concrete floor toppings to required lines and levels. Place topping in checkerboard panels, dimension not to exceed 20 ft (6 m).

E. Screed toppings level, maintaining surface flatness of maximum 1:1000.

3.05 CONCRETE FINISHING

A. Provide formed concrete surfaces to be left exposed concrete walls, columns, beams and joists with smooth rubbed, sand float or sack rubbed finish.

B. Finish concrete floor surfaces to requirements of TS1248.

C. Wood float surfaces which will receive quarry tile, ceramic tile, terrazzo with full bed setting system.

D. Steel trowel surfaces which will receive carpeting, resilient flooring, seamless flooring, thin set quarry tile, thin set ceramic tile.

E. Steel trowel surfaces which are scheduled to be exposed.

F. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100, 1:50 slopes if not indicated on drawings.

3.06 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Cure concrete floor surfaces to requirements of Section 03370.

D. Ponding: Maintain 100 percent coverage of water over floor slab areas continuously for 4 days.

E. Spraying: Spray water over floor slab areas and maintain wet for 7 days.

3.07 FIELD QUALITY CONTROL

A. Section 01400 - Quality Assurance: Field inspection, testing, adjusting, and balancing.

B. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.

C. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

D. Three concrete test cylinders will be taken for every 75 or less cu yds (57 or less) cu m of each class of concrete placed.

E. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

F. One slump test will be taken for each set of test cylinders taken.

3.08 PATCHING

A. Allow Contracting Officer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Contracting Officer upon discovery.

C. Patch imperfections as directed.

3.09 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Contracting Officer.

C. Do not patch, fill, touch-up, repair or replace exposed concrete except upon express direction of Contracting Officer for each individual area.

3.10 SCHEDULE - CONCRETE TYPES AND FINISHES

A. Foundation Walls: 3,000 psi (20 MPa) 28 day concrete, form finish with honeycomb filled surface.

B. Underside of Supported Floors and Structure Exposed to View: 3,000 psi (20 MPa) 28 day concrete, sack rubbed finish.

3.11 SCHEDULE - JOINT FILLERS

A. Basement Floor Slab Perimeter: Joint filler Type A set 1/8 inch (3 mm) below floor slab elevation.

B. Exterior Retaining Wall at Loading Dock: Joint filler Type F recessed 3/8 inch (9 mm) with sealant cover.

END OF SECTION 03300

SECTION 03346 - CONCRETE FLOOR FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finishing slabs-on-grade, monolithic floor slab and separate floor toppings.

B. Surface treatment with concrete hardener, sealer and slip resistant coatings.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete.

B. Section 03370 - Concrete Curing.

C. Section 07900 - Joint Sealers.

1.03 REFERENCES

A. TS-500 - Building Code Requirements for Reinforced Concrete.

B. TS-3233 - Building Code Requirements for Prestressed Concrete.

C. ASTM E1155 - Determining Floor Flatness and Levelness Using the F-Number System (Inch-Pound Units).

D. TS-802 - Design Concrete Mixes.

E. TS-4047 - Reinforced Lightweight Concrete Floor and Roof Plates.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data on concrete hardener, sealer and slip resistant treatment, compatibilities and limitations.

1.05 MAINTENANCE DATA

A. Submit under provisions of Section 01700.

1.06 NOT USED

1.07 MOCKUP

A. Provide mockup of floor finish under provisions of Section 01400.

B. Construct mockup area under conditions similar to those which will exist during actual placing.

C. Locate where directed.

D. Mockup may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Deliver materials in manufacturer's packaging including application instructions.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Temporary Lighting: Minimum 200 W light source, placed 8 feet (2.5 m) above the floor surface, for each 425 sq ft (40 sq m) of floor being finished.

B. Temporary Heat: Ambient temperature of 50 degrees F (10 degrees C) minimum.

C. Ventilation: Sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

1.10 COORDINATION

A. Coordinate the work with concrete floor placement and concrete floor curing.

PART 2 PRODUCTS

2.01 NOT USED

2.02 COMPOUNDS - HARDENERS AND SEALERS

A. Chemical Hardener: Magnesium fluosilicate and zinc fluosilicate blend, dry powder or liquid type.

B. Metallic Hardener: Premixed, dry powder, static disseminating, oxidizable metallic, spark resistant hardener.

C. Non-Metallic Hardener: Premixed, dry powder, clear, emery aggregate or quartz aggregate, abrasion resistant hardener.

D. Exposed Aggregate Retarder for Flat Surfaces: Color as selected from manufacturer's standard range.

2.03 SLIP RESISTANT TREATMENT

A. Slip Resistant Finish: Aluminum oxide or Silica sand type, color as selected from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify site conditions before starting work.

B. Verify that floor surfaces are acceptable to receive the work of this section.

3.02 FLOOR FINISHING

A. Finish concrete floor surfaces in accordance with specifications.

B. Wood float surfaces which will receive quarry tile, ceramic tile or cementitious terrazzo.

C. Steel trowel surfaces which will receive carpeting, resilient flooring, seamless flooring, thin set terrazzo, thin set quarry tile or thin set ceramic tile.

D. Steel trowel surfaces which are scheduled to be exposed.

E. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains as indicated on drawings.

3.03 FLOOR SURFACE TREATMENT

A. Apply treatment as specified on drawings. Apply in accordance with manufacturer's instructions.

3.04 TOLERANCES

A. Maximum Variation of Surface Flatness For Exposed Concrete Floors: 1/4 inch (6 mm) in 10 ft (3 m).

B. Maximum Variation of Surface Flatness Under Seamless Resilient Flooring: 1/8 inch (3 mm) in 10 ft (3 m).

C. Maximum Variation of Surface Flatness Under Carpeting: 1/8 inch (3 mm) in 10 ft (3 m).

D. Correct the slab surface if the actual F (F) or F (L) number for the floor installation measures less than required.

E Correct defects in the defined traffic floor by grinding or removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

END OF SECTION 03346

SECTION 03361 - SHOTCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pneumatically applied concrete.

1.02 RELATED SECTIONS

A. Section 03100 - Concrete Formwork: Prepared forms to achieve configuration, contours, and tolerances required.

B. Section 03200 - Concrete Reinforcement.

C. Section 07900 - Joint Sealers.

1.03 REFERENCES

A. ACI 506.2 - Specification for Materials, Proportioning and Application of Shotcrete.
B. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
C. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
D. ASTM C33 - Standard Specification for Concrete Aggregates.
E. ASTM C150 - Standard Specification for Portland Cement.
F. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
G. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
H. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
I. TS-802 - Design Concrete Mixes.
J. TS-19 - Portland Cement.
K. TS-706 - Aggregate for Concrete.
L. TS-3452 - Chemical Admixtures for Concrete.
M. TS-3456 - Air Entraining Admixtures for Concrete.

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Shop Drawings: Indicate formwork, dimensions and thickness, tolerances and contours, reinforcement and accessories.

C. Product Data: Provide data on admixtures.

D. Mix design and test reports.

1.05 QUALITY ASSURANCE

A. Design work of this section under direct supervision of a Professional Structural Engineer experienced in design of this work.

B. Applicator Qualifications: Company specializing in performing the work of this Section with minimum three years documented experience.

1.06 MOCK-UP

A. Section 01400 - Quality Control: Requirements for mock-up.

B. Sample Panel: Provide mock-up of sufficient size to indicate special treatment or finish required.

C. Test Panels: Prior to starting work provide mock-up for evaluation of materials and workmanship:
   1. Provide three test panels fabricated by placing shotcrete onto plywood for each mix design being considered and for each shooting position to be encountered.
   2. Form panels to identical shotcrete thickness with reinforcement placement.
   3. Repair core holes after testing.

D. Locate mock-up where directed.

E. Mock-up may remain as part of the Work.

1.07 NOT USED

1.08 ENVIRONMENTAL REQUIREMENTS

A. Maintain material and surrounding air temperature at minimum 50 degrees F (10 degrees C) prior to and during installation and maintain material at this minimum temperature for 7 days after completion of work. Provide equipment and cover to maintain minimum temperature.

B. Suspend shotcrete operations during high winds, rainy weather or near freezing temperatures when Work cannot be protected.

1.09 COORDINATION

A. Coordinate the Work with associated items that are placed within shotcrete work.

B. Coordinate with sculpturing rough-in work, coloring, staining requirements and associated or adjacent materials.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cement: Portland Cement.

B. Aggregate: Normal weight, 3/8 inch (9 mm) maximum size.

C. Admixtures: Chemical type or Air entraining type.

D. Reinforcing Bars: Type and size as specified on drawings.

E. Reinforcing Mesh: Welded wire fabric, as specified on drawings.

F. Water: Clean, potable and not detrimental to shotcrete.

G. Curing Compound: Type not detrimental to application of subsequent surface finish materials.

H. Bonding Agent: Type compatible with substrate and subsequent materials.

I. Alignment Wire: Small gage, high strength steel wire.

2.02 SHOTCRETE MIX

A. Provide wet, dry or wet or dry mix design that gives good compaction and low percentage of rebound, is stiff enough not to sag and conforms to following requirements:
1. Compressive Strength (28 day minimum): 3,000 psi (20 MPa).
2. Aggregate Size (maximum): 3/8 inch (9 mm).
3. Air Entrainment: As specified by the laboratory.
4. Chemical Admixture: As specified by the laboratory.
5. Pozzolanic Mineral Admixture: As specified by the laboratory.
6. Slump (plus or minus 1/2 inch): 1 inch (25 mm.

B. Maintain quality control records during production of shotcrete; make records available.

2.03 SOURCE QUALITY CONTROL (AND TESTS)

A. Provide testing and analysis of shotcrete under provisions of Section 01400.

B. Prior to start of work, independent testing agency will review mix proportions, gradation and quality of aggregate.

C. Test samples in accordance with ACI 506.2.

D. Independent testing agency will test mock-up panels as follows:
1. Drill 3 inch (75 mm) diameter core samples from test panels.
2. Test for strength, water absorption, drying and shrinkage, freeze and thaw resistance.

E. Modify mix design as required based on results of testing and inspection.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that conditions are acceptable and are ready to receive work.

C. Verify that field measurements are as shown on Drawings.

D. Verify fabricated forms are:
   1. True to line and dimension.
   2. Adequately braced against vibration during placement.
   3. Constructed to permit escape of trapped air during gunning operations.
   4. Constructed to minimize rebound during gunning operations.

E. Ensure correct placement of reinforcement and sufficient clearance exists around reinforcement to permit complete encasement.

F. Ensure easy access to shotcrete surfaces for screeding and finishing and to permit uninterrupted application.

3.02 PREPARATION

A. Remove existing unsound concrete from substrate surfaces.

B. Minimize abrupt changes in thickness of repair. Remove square external corners from substrate by radiusing the edges.

C. Clean surfaces to receive shotcrete.

D. Determine operating procedures for placement in close quarters, extended distances or around unusual obstructions where placement velocities and mix consistency may be adjusted during application.

E. Clean and wet cementitious or absorptive substrate surfaces prior to receiving shotcrete. Keep porous surfaces damp for several hours prior to placement of shotcrete.

F. Protect adjacent surfaces not receiving shotcrete.

3.03 ALIGNMENT CONTROL

A. Provide alignment wire to establish thickness and plane of required surfaces.

B. Install alignment wire at corners and offsets not established by forms.

C. Tighten alignment wire true to line. Position adjustment devices to permit additional tightening.

3.04 APPLICATION

A. Place reinforcement in accordance with details on drawings.

B. Use mixing and delivery equipment capable of thoroughly mixing aggregate, cement and water in sufficient quantity to maintain continuous and uniform placement.

C. Do not apply shotcrete more than 45 minutes after adding Portland cement to the mix.

D. Do not place shotcrete on surfaces that are frozen, spongy or where there is free water.

E. Achieve maximum compaction with minimum rebound.

F. Build-up to required thickness in multiple passes to achieve layering. Encase reinforcement with the first pass.

G. Allow each layer to take initial set before applying succeeding layers.

H. Do not permit applied shotcrete to sag, slough or displace.

I. After initial set of final layer, remove excess material outside of forms and alignment lines.

J. Clean with air/water pressure jet.

K. Finish surface of final layer as specified and detailed on drawings.

L. Remove rebound material which does not fall clear of work. Remove rebound at construction and expansion joints. Discard salvaged rebound.

M. Maintain shotcrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of shotcrete.

N. Immediately after placement, protect shotcrete from premature drying, excessively hot or cold temperatures and mechanical injury.

O. Maintain surfaces wet for a minimum of 7 days.

P. Sound test the applied material with hammer for voids. Expose voids and replace with new shotcrete ensuring full bond with adjacent work.

3.05 FIELD QUALITY CONTROL

A. Section 01400 - Quality Assurance.

B. Provide additional test panels, as specified for mock-up, during the course of the work as may be requested by the testing agency.

3.06 PROTECTION OF FINISHED WORK

A. Section 01700 - Contract Closeout: Protecting installed work.

B. Do not permit applied work to damage adjacent surfaces.

END OF SECTION 03361

SECTION 03370 - CONCRETE CURING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Initial and final curing of horizontal and vertical concrete surfaces.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete.

B. Section 03346 - Concrete Floor Finishing.

1.03 REFERENCES

A. TS-500 - Building Code Requirements for reinforced Concrete.

B. TS-3233 - Building Code Requirements for Prestressed Concrete.

C. TS-4047 - Reinforced Lightweight Concrete Floor and Roof Plates.

D. ASTM C171 - Sheet Materials for Curing Concrete.

E. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

F. ASTM D2103 - Polyethylene Film and Sheeting.

G. TS-1247 - Mixing, Placing and Curing Concrete.

H. TS-10966 - Liquid Membrane Forming Compounds for Curing Concrete.

I. TS-6905 - Polyethylene Film for General Use.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data on curing compounds, mats, compatibilities and limitations.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products under provisions of Section 01600.

B. Deliver curing materials in manufacturer's packaging including application instructions.

PART 2 PRODUCTS

2.01 MATERIALS

A. Absorptive Mats Burlap-polyethylene, minimum 8 oz/sq yd (270 grams/sq m) bonded to prevent separation during handling and placing.

B. Water: Potable, not detrimental to concrete.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify substrate conditions prior to starting Work.

B. Verify that substrate surfaces are ready to be cured.

3.02 EXECUTION - HORIZONTAL SURFACES

A. Cure floor surfaces in accordance with specifications.

B. Absorptive Mat: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.

3.03 EXECUTION - VERTICAL SURFACES

A. Cure surfaces in accordance with specifications.

3.04 PROTECTION OF FINISHED WORK

A. Protect finished Work from physical damage.

B. Do not permit traffic over unprotected floor surface.

END OF SECTION 03370

SECTION 03732 – CONCRETE MASONRY REPAIR

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparation of concrete and application of repair materials.

B. Rehabilitation or Restoration of concrete or masonry surfaces.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete.

1.03 NOT USED

1.04 REFERENCES

A. ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
B. ASTM A615/A615M - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
C. ASTM A616/A616M - Rail-Steel Deformed and Plain Bars for Concrete Reinforcement.
D. ASTM A617/A617M - Axle-Steel Deformed and Plain Bars for Concrete Reinforcement.
E. ASTM C33 - Specifications for Concrete Aggregates.
F. ASTM C150 - Portland Cement.
G. ASTM C404 - Aggregates for Masonry Grouts.
H. ASTM C882 - Bond Strength of Epoxy Resin Systems Used with Concrete.
I. ASTM D638 - Test Method for Tensile Properties of Plastics.
J. ASTM D695 - Compressive Properties of Rigid Plastics.
K. ASTM D790 - Flexural Properties of Plastics and Electrical Insulating Materials.
L. TS-3271 - Steel Wires for Prestressed Concrete.
M. TS-708 - Steel Bars for Concrete.
N. TS-706 - Aggregate for Concrete.
O. TS-19 - Portland Cement.
P. TS-7830 - Quality Assurance of Welding Operations-Steels.
Q. TS-4916 - Lightweight Mortar for Masonry.
R. TS-985 - Determination of Flexural Properties of Rigid Plastics.
S. TS-1096 - Test for Compressive Properties of Rigid Plastics.
T. TS-1398 - Determination of Tensile Properties-Plastics.
U. TS-2252 - Epoxy Compounds.

1.05 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions and general recommendations regarding each material.

1.06 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Procedures for submittals.

B. Manufacturer's Certificate: Certify that specified products meet or exceed specified requirements.

1.07 SUBMITTALS AT PROJECT CLOSEOUT

A. Section 01730 - Operation and Maintenance Data.

B. Accurately record actual locations of structural reinforcement repairs and type of repair.

1.08 QUALITY ASSURANCE

A. Perform welding work in accordance with specifications.

B. Materials Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

C. Design reinforcement splices under direct supervision of a Professional Structural Engineer experienced in design of this Work.

D. Applicator: Company specializing in concrete repair with minimum years documented experience.

1.09 MOCK-UP

A. Section 01400 - Quality Control: Requirements for mock-up.

B. Provide panel illustrating patching method, color and texture of repair surface.

C. Prepare one sample of each type of injection and patching procedure.

D. Locate where directed.

E. Mock-up may remain as part of the Work.

1.10 DELIVERY, STORAGE, AND PROTECTION

A. Section 01600 - Material and Equipment: Transport, handle, store and protect products.

B. Comply with instructions for storage, shelf life limitations and handling.

PART 2 PRODUCTS

2.01 NOT USED

2.02 PATCHING MATERIALS

A. Epoxy Resin: Two-part epoxy adhesive containing 100 percent solids, meeting the following minimum characteristics:

Characteristic		Test Method Results
1.	Bond Strength	2,700 psi (18.6 MPa)
2.	Tensile Strength	6,600 psi (45 MPa)
3.	Elongation	2 percent at 7 days at 70 degrees F (21 degrees C)
4.	Flexural Strength	8,000 psi (45 MPa)
5.	Compressive Strength	6,500 psi (55 MPa)

B. Bonding Agent: Polyvinyl acetate emulsion, dispersed in water while mixing, non-coagulant in mix, water resistant when cured.

C. Portland Cement: White color.

D. Sand: uniformly graded, clean.

E. Water: Clean and potable.

F. Cleaning Agent: Commercial muriatic acid, percent strength as specified on drawings.

2.03 NOT USED

2.04 MIXING EPOXY MORTARS

A. Mix epoxy mortars in accordance with manufacturer's instructions for purpose intended.

B. Mix components in clean equipment or containers. Conform to pot life and workability limits.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means acceptance of existing surfaces.

3.02 PREPARATION

A. Clean concrete or masonry surfaces of dirt, laitance, corrosion or other contamination; wire brush using acid; rinse surface and allow to dry.

B. Flush out cracks and voids with muriatic acid to remove laitance and dirt. Chemically neutralize by rinsing with water.

C. Provide temporary entry ports spaced to accomplish movement of fluids between ports; no deeper than the depth of the crack to be filled or port size diameter no greater than the thickness of the crack. Provide temporary seal at concrete or masonry surface to prevent leakage of adhesive.

D. For areas patched with epoxy mortar, remove broken and soft concrete or masonry unit 1/4 inch (6 mm) deep. Remove corrosion from steel. Clean surfaces mechanically; wash with acid; rinse with water.

3.03 REPAIR WORK

A. Repair exposed structural, shrinkage and settlement cracks of concrete or masonry by the epoxy injection or bonding agent and cementitious paste method.

B. Apply surface finish.

3.04 INJECTION - EPOXY RESIN ADHESIVE

A. Inject adhesive into prepared ports under pressure using equipment appropriate for particular application.

B. Begin injection at lower entry port and continue until adhesive appears in adjacent entry port. Continue from port to port until entire crack is filled.

C. Remove temporary seal and excess adhesive.

D. Clean surfaces adjacent to repair and blend finish.

3.05 APPLICATION - EPOXY MORTAR

A. Trowel apply mortar mix. Tamp into place filling voids at spalled areas.

3.06 APPLICATION - CEMENTITIOUS MORTAR OR GROUT

A. Apply coating of bonding agent to concrete surfaces. Provide full surface coverage.

B. Apply cementitious mortar or grout by steel trowel. Tamp into place filling voids at spalled areas. Work mix into honeycomb.

C. Damp cure cementitious mortar or grout for four days.

3.07 FIELD QUALITY CONTROL

A. Section 01400 - Quality Control: Field inspection and testing.

END OF SECTION 03732

SECTION 04100 - MORTAR AND MASONRY GROUT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mortar and grout for masonry.

1.02 RELATED SECTIONS

A. Section 01400 - Quality Control: Testing laboratory services.

B. Section 08115 - Custom Steel Frames: Grouting steel door frames.

1.03 NOT USED

1.04 REFERENCES

A. TS-19 - Portland Cement.
B. TS-22 - Masonry Cement
C. TS-24 - Physical Testing Methods of Cement
D. TS-30 - Quicklime for Use in Building.
E. TS-32 - Testing Methods of Quicklime and Hydrated Lime
F. TS-2717 - Aggregate for Masonry Mortar
G. TS-2848 - Mortar for Masonry.
H. TS-3443 - Test Method for Bond Strength of Mortar to Masonry Units.
I. TS-3452 - Chemical Admixtures for Concrete.
K. TS-4022 - Hydrated Lime for Use in Building.
L. TS-11051 - Specification for Processing Additions for Use in the Manufacture of Hydraulic Cements.
M. ACI 530 - Building Code Requirements for Masonry Structures.
N. ACI 530.1 - Specifications For Masonry Structures.
O. ASTM C5 - Quicklime for Structural Purposes.
P. ASTM C91 - Masonry Cement.
Q. ASTM C94 - Ready-Mixed Concrete.
R. ASTM C144 - Aggregate for Masonry Mortar.
S. ASTM C150 - Portland Cement.
T. ASTM C199 - Test Method for Pier Test for Refractory Mortar.
U. ASTM C207 - Hydrated Lime for Masonry Purposes.
V. ASTM C270 - Mortar for Unit Masonry.
W. ASTM C387 - Packaged, Dry, Combined Materials, for Mortar and Concrete.
Y. ASTM C404 - Aggregates for Masonry Grout.
Z. ASTM C476 - Grout for Masonry.
AA. ASTM C595 - Blended Hydraulic Cement.
AB. ASTM C780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
AC. ASTM C1019 - Method of Sampling and Testing Grout.
AD. ASTM C1072 - Method for Measurement of Masonry Flexural Bond Strength.
AE. ASTM C1142 - Ready-Mixed Mortar for Unit Masonry.
AF. ASTM E447 - Test Methods for Compressive Strength of Masonry Prisms.

AG. ASTM E518 - Test Method for Flexural Bond Strength of Masonry.
AH. IMIAC (International Masonry Industry All-Weather Council) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Include design mix, indicate required environmental conditions, and admixture limitations.

C. NOT USED

D. Reports: Submit reports on mortar indicating conformance to specifications.

E. Reports: Submit reports on grout indicating conformance to specifications.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Submit premix mortar manufacturer's installation instructions under provisions of Section 01300.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with specifications.

B. Maintain one copy of each document on site.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01600.

B. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.01 NOT USED

2.02 MATERIALS

A. Portland Cement: Shall comply TS 19.

B. Mortar Aggregate: standard masonry type conforming TS 2717.

C. Hydrated Lime: Shall comply TS 4022.

D. Grout Course Aggregate: Maximum 3/8 inch (10 mm) size volume.

E. Grout Fine Aggregate: sand.

F. Water: Clean and potable.

G. Bonding Agent: Latex or Epoxy type.

2.03 MORTAR COLOR

A. Mortar Color: Color as selected or to match existing.

2.04 ADMIXTURES

A. Admixtures shall conform to TS 3452.

2.05 MORTAR MIXES

A. Mortar for both side of the exterior walls shall be IZOTUGLA HARCI-75 (or equal). Mortar for the other walls shall be cement mortar conforming to TS 2848. Certified copies of laboratory-established proportions shall be submitted with the required test reports and test data.

B. Laboratory-established proportions shall not be changed and materials with different physical or chemical characteristics shall not be used in mortar for the work unless additional evidence is furnished that the mortar meets the specified requirements. Mortar with an average compressive strength of 125 kg/sq.cm shall be used. Mortar used for covering reinforcing bars and for sealing and anchorage shall be mortar with no lime content. Mortar that has stiffened because of chemical reaction (hydration) shall not be used. Except as specified below, mortar shall be used and replaced in final position within 2-1/2 hours after mixing when air temperature is 27 degrees C or higher and within 3-1/2 hours after mixing when air temperature id less than 27 degrees C. Mortar nor used within these time intervals shall be discarded. When cement or cements used in the mortar have been tested and the observed time of initial set as determined under TS 3443 has been ascertained, an optional method of determining the time interval during which the mortar must be placed in final position may be used as follows:

Air Temperature in Degrees C	Time Interval After Mixing
27 or higher	Time out initial set minus 1 hour
Less than 27	Time out initial set minus 1/2 hour

2.06 MORTAR MIXING

A. Thoroughly mix mortar ingredients in accordance with specifications in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Add mortar color and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

D. Do not use anti-freeze compounds to lower the freezing point of mortar.

E. If water is lost by evaporation, re-temper only within two hours of mixing.

F. Use mortar within two hours after mixing at temperatures of 90 degrees F (32 degrees C), or two-and-one-half hours at temperatures under 40 degrees F (5 degrees C).

2.07 GROUT MIXES

A. Bond Beams and Lintels: 3,000 psi (21 MPa) strength at 28 days; 8-10 inches (200-250 mm) slump; premixed type or mixed in accordance with specifications.

B. Engineered Masonry: 3,000 psi (21 MPa) strength at 28 days; 8-10 inches (200-250 mm) slump; premixed type or mixed in accordance with specifications.

2.08 GROUT MIXING

A. Mix grout in accordance with specifications.

B. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

C. Do not use anti-freeze compounds to lower the freezing point of grout.

2.09 MIX TESTS

A. Test mortar and grout in accordance with Section 01400.

B. Testing of Mortar Mix: In accordance with specifications for compressive strength, consistency, mortar aggregate ratio, water content, air content and splitting tensile strength.

C. Testing of Grout Mix: In accordance with specifications for compressive strength and slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Request inspection of spaces to be grouted.

3.02 PREPARATION

A. Apply bonding agent to existing concrete surfaces.

B. Plug clean-out holes with masonry units. Brace masonry for wet grout pressure.

3.03 INSTALLATION

A. Install mortar in accordance with specifications. Install grout in accordance with specifications

B. Work grout into masonry cores and cavities to eliminate voids.

C. Do not install grout in lifts greater than 16 inches (400 mm) or two CMU courses without consolidating grout by rodding.

D. Do not displace reinforcement while placing grout.

E. Remove excess mortar from grout spaces.

3.04 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.

B. Test and evaluate mortar in accordance with specifications.

C. Test and evaluate grout in accordance with specifications.

D. Test mortar and masonry units to specifications; test in conjunction with masonry unit sections specified.

END OF SECTION 04100

SECTION 04300 - UNIT MASONRY SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete masonry, Brick or Clay tile units.

B. Pre-faced concrete masonry, brick or clay tile units.

C. Reinforcement, anchorage and accessories.

D. Parged masonry surfaces.

1.02 NOT USED

1.03 NOT USED

1.04 RELATED SECTIONS

A. Section 01400 - Quality Control, Section 01410 - Testing Laboratory Services: Testing laboratory services.

B. Section 04100 - Mortar and Masonry Grout: Mortar and grout.

C. Section 05500 - Metal Fabrications: Loose steel lintels and fabricated steel items.

D. Section 07900 - Joint Sealers: Rod and sealant at control and expansion] joints.

1.05 NOT USED

1.06 REFERENCES

A. ACI 530 - Building Code Requirements for Masonry Structures.
B. ACI 530.1 - Specifications For Masonry Structures.
C. ASTM A82 - Cold-Drawn Steel Wire for Concrete Reinforcement.
D. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.
E. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
F. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.
G. ASTM A580 - Stainless and Heat-Resisting Steel Wire.
H. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
I. ASTM A641 - Zinc-Coated (Galvanized) Carbon Steel Wire.
J. ASTM B370 - Copper Sheet and Strip for Building Construction.
K. ASTM C34 - Structural Clay Load-Bearing Wall Tile.
L. ASTM C55 - Concrete Building Brick.
M. ASTM C56 - Structural Clay Non-Load Bearing Tile.
N. ASTM C62 - Building Brick (Solid Masonry Units Made From Clay or Shale).

O. ASTM C73 - Calcium Silicate Face Brick (Sand-Lime Brick).
P. ASTM C90 - Load-Bearing Concrete Masonry Units.
Q. ASTM C126 - Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.
R. ASTM C129 - Non-Load Bearing Concrete Masonry Units.
S. ASTM C212 - Structural Clay Facing Tile.
T. ASTM C216 - Facing Brick (Solid Masonry Units Made From Clay or Shale).
U. ASTM C315 - Clay Flue Linings.
V. ASTM C530 - Structural Clay Non-Load Bearing Screen Tile.
W. ASTM C652 - Hollow Brick (Hollow Masonry Units Made From Clay or Shale).
X. ASTM C744 - Pre-faced Concrete and Calcium Silicate Masonry Units.
Y. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.
Z. UL - Fire Resistance Directory.
AA. TS-3233 - Building Code Requirements for Prestressed Concrete.
AB. TS-3271 - Steel Wires for Prestressed Concrete.
AC. TS-914 - Galvanizing.
AD. TS-822 - Steel Sheets, Hot-Dipped Galvanized.
AE. TS-708 - Steel Bars for Concrete.
AF. TS-554 - Cold Rolled Copper Sheets and Strips.
AG. TS-705 - Solid Bricks.
AH. TS-704 - Clay Bricks.
AI. TS-808 - Sandlime-Bricks.
AJ. TS-2902 - Clay Facing Tile, Facing Brick and Solid Masonry Units.

1.07 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data for masonry units and fabricated wire reinforcement.

C. Samples: Submit as specified.

D. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.08 QUALITY ASSURANCE

A. Perform Work in accordance with specifications.

B. Maintain one copy copie of each document on site.

1.09 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.10 REGULATORY REQUIREMENTS

A. Conform to applicable code requirements for masonry construction.

1.11 MOCKUP

A. Provide mockup of masonry under provisions of Section 01400.

B. Construct a masonry wall into a panel size and type as specified on drawings.

C. Locate where directed.

D. Mockup may remain as part of the Work.

1.12 NOT USED

1.13 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Accept units on site. Inspect for damage.

1.14 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.

1.15 COORDINATION

A. Coordinate the masonry work with associated construction.

1.16 EXTRA MATERIALS

A. Provide 20 of each size, color and type of units.

PART 2 PRODUCTS

2.01 NOT USED

2.02 CONCRETE MASONRY UNITS

A. Hollow Load Bearing Block Units (CMU): Non-moisture Controlled; normal weight.

B. Solid Load-Bearing Block Units (CMU): Non-moisture Controlled; normal weight.

C. Hollow Non-Load Bearing Block Units (CMU): Non-moisture Controlled; normal weight.

D. Decorative Block Units: Non-moisture Controlled color as selected.

E. Pre-faced Block Units: With resinous surfacing on masonry units, Non-moisture Controlled; normal weight; color as selected.

F. Concrete Brick Units: Non-moisture Controlled; normal weight.

G. Size and Shape: As specified on drawings. Provide special units for 90 degree corners, bond beams, lintels, coved base and bullnosed corners.

2.03 NOT USED

2.04 BRICK UNITS

A. Face Brick: Type and color as specified on drawings.

B. Building Brick: Solid units.

C. Hollow Facing and Building Brick: Type and color as specified on drawings.

D. Sand-Lime Face Brick: As specified on drawings.

E. Ceramic Glazed Face Brick: As specified on drawings.

F. Fire Brick: Class, Regular, Spall Resistant with an alumina content as specified on drawings.

G. Size and Shape: As specified on drawings. Provide special units for 90 degree corners, lintels and bullnosed corners.

H. Special Brick Shape: Shaped to profile indicated; surface texture on sides and ends.

I. Giant Face Brick: Type and color as specified on drawings.

J. Giant Hollow Facing and Building Brick: Type and color as specified on drawings.

K. Size and Shape of Giant Brick Units: Nominal size as specified on drawings. Provide special units for 90 degree corners, lintels and bullnosed corners.

L. Special Giant Brick Shape: Shaped to profile indicated; surface texture on sides and ends.

2.05 NOT USED

2.06 CLAY TILE UNITS

A. Clay Load Bearing Wall Tile: Type, color, texture and finish as specified on drawings.

B. Clay Non-load Bearing Screen Tile: Type, color, texture and pattern as specified on drawings.

C. Clay Non-load Bearing Screen Tile: Type, color, texture and pattern as specified on drawings.

D. Clay Facing Tile Units: Standard Class; smooth surface finish, two faces.

E. Clay Tile Units: Nominal modular size as specified on drawings. Provide special units for 90 degree corners, tee intersections, lintels, bond beams and bullnosed corners.

F. Special Tile Shape: Shaped to profile indicated; surface texture on sides and ends.

G. Clay Flue Lining: Type and size as specified on drawings.

2.07 REINFORCEMENT AND ANCHORAGE

A. Single Wythe Joint Reinforcement: Ladder type; steel wire, hot dip galvanized after fabrication, 3/16 inch (4.8 mm) side rods with cross ties.

B. Multiple Wythe Joint Reinforcement: Ladder type; with moisture drip; steel wire, hot dip galvanized after fabrication, 3/16 inch (4.8 mm) side rods with cross ties.

C. Reinforcing Steel: Specified in Section 03200, galvanized finish.

D. Strap Anchors: Bent steel shape, hot dip galvanized finish.

E. Wall Ties: Corrugated formed sheet metal, adjustable, hot dip galvanized finish.

F. Dovetail Anchors: Bent steel strap, galvanized finish.

2.08 MORTAR AND GROUT

A. Mortar and Grout: As specified in Section 04100.

2.09 FLASHINGS

A. Plastic Flashings: Sheet polyvinyl chloride or polyethylene, thickness as specified on drawings.

B. Copper/Kraft Paper Flashings: Sheet copper bonded to fiber reinforced asphalt treated Kraft paper.

C. Plastic/Kraft Paper Flashings: Sheet polyethylene bonded to layer of fiber reinforced asphalt and backed with Kraft paper.

D. Copper: Soft temper, natural finish, thickness as specified on drawings.

E. Pre-coated Galvanized Steel: Core steel, shop pre-coated, color as specified on drawings.

F. Galvanized Steel: Core steel.

G. Stainless Steel: Soft temper; smooth finish, thickness as specified on drawings.

H. Lap Sealant: Butyl or Acrylic type as specified in Section 07900.

2.10 ACCESSORIES

A. Preformed Control Joints: Rubber, Neoprene or Polyvinyl chloride material. Provide with corner and tee accessories, heat or cement fused joints.

B. Joint Filler: Closed cell polyvinyl chloride, polyethylene, polyurethane or rubber; oversized 50 percent to joint width; self expanding.

C. Building Paper: Asphalt saturated felt.

D. Nailing Strips: Softwood, preservative treated for moisture resistance, dovetails shape, sized to masonry joints.

E. Weeps: Preformed plastic vents with sloping louvers.

F. Cavity Vents: Molded polyvinyl chloride grilles; insect resistant.

G. Chimney Cap: Precast concrete, sized to cover chimney construction plus additional overhang for drip on four sides, slope from flue opening to edges for natural drainage.

H. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.11 LINTELS

A. Precast Concrete Lintels: Type and size as shown on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify items provided by other sections of work are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied to other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING

A. Establish lines, levels and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
1. Bond: Running.
2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
3. Mortar Joints: Concave.

D. Brick Units:
1. Bond: Running.
2. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).

3. Mortar Joints: Concave.

E. Pre-finished, Decorative Clay tile Units:
1. Bond: Running.
2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
3. Mortar Joints: Concave.

3.04 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.

D. Remove excess mortar as work progresses.

E. Interlock intersections and external corners.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where wall tile is scheduled, cement parging is required, resilient base is scheduled, cavity insulation vapor barrier adhesive is applied, or bitumen dampproofing is applied.

I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

K. Lay clay tile flue linings vertical, bedded in concrete block or clay tile units. Extend above chimney cladding 8 inches (200 mm). Trowel mortar smooth over chimney cladding and slope for positive drainage.

L. Place precast chimney cap atop chimney masonry; mortar into place; seal to protruding flue.

3.05 WEEPS

A. Install weeps in veneer horizontally above through-wall flashing, above shelf angles and lintels and at bottom of walls.

3.06 CAVITY WALL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weeps.

B. Build inner wythe ahead of outer wythe to receive cavity insulation and air/vapor barrier adhesive.

3.07 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

A. Install horizontal joint reinforcement as specified on drawings.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Place joint reinforcement continuous in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches (150 mm).

E. Reinforce joint corners and intersections with strap anchors 16 inches (400 mm) oc.

3.08 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Install horizontal joint reinforcement 16 inches(400 mm) oc.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Place joint reinforcement continuous in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches (150 mm).

E. Embed wall ties in masonry back-up to bond veneer at maximum 16 inches (400 mm) oc vertically and 36 inches (900 mm) oc horizontally. Place at maximum 3 inches (75 mm) oc each way around perimeter of openings, within 12 inches (300 mm) of openings.

F. Secure wall ties, rod and strap anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches (400 mm) oc vertically and 36 inches (900 mm) oc horizontally. Place at maximum 3 inches (75 mm) oc each way around perimeter of openings, within 12 inches (300 mm) of openings.

G. Reinforce joint corners and intersections with strap anchors 16 inches (400 mm) oc.

3.09 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

A. Install horizontal joint reinforcement 16 inches (400 mm) oc.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Place joint reinforcement continuous in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches (150 mm).

E. Embed anchors in concrete. Embed anchorages in joints as specified on drawings.

F. Reinforce joint corners and intersections with strap anchors 16 inches (400 mm) oc.

3.10 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY

A. Install horizontal joint reinforcement 16 inches (400 mm) oc.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Place joint reinforcement continuous in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches (150 mm).

E. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.

F. Embed anchors embedded in concrete. Embed anchorages in joints as specified on drawings.

G. Reinforce joint corners and intersections with strap anchors 16 inches (400 mm) oc.

3.11 MASONRY FLASHINGS

A. Extend flashings horizontally at foundation walls, above ledge or shelf angles and lintels, under parapet caps and at bottom of walls.

B. Turn flashing up minimum 8 inches (200 mm) and bed into mortar joint of masonry back-up.

C. Lap end joints minimum 6 inches (150 mm) and seal watertight.

D. Turn flashing, fold and seal at corners, bends and interruptions.

3.12 LINTELS

A. Install loose steel or precast concrete lintels over openings.

B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.

C. Openings Up To 42 inches (1 070 mm) Wide: Place reinforcing bars as detailed on drawings.

D. Openings From 42 inches (1 070 mm) Up To 78 inches (1 980 mm) Wide: Place reinforcing bars as detailed on drawings.

E. Openings Over 78 inches (1 980 mm): Reinforce openings as detailed on drawings.

F. Do not splice reinforcing bars.

G. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.

H. Place and consolidate grout fill without displacing reinforcing.

I. Allow masonry lintels to attain specified strength before removing temporary supports.

J. Maintain minimum bearing on each side of opening.

3.13 GROUTED COMPONENTS

A. Reinforce bond beam as detailed on drawings.

B. Reinforce pilaster as detailed on drawings.

C. Lap splices minimum 24 bar diameters.

D. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.

E. Place and consolidate grout fill without displacing reinforcing.

F. At bearing locations, fill masonry cores with grout for a minimum 12 inches (300 mm) either side of opening.

3.14 ENGINEERED MASONRY

A. Lay masonry units with core cells vertically aligned clear of mortar and unobstructed.

B. Place mortar in masonry unit bed joints back 1/4 inch (6 mm) from edge of unit grout spaces, bevel back and upward. Permit mortar to cure 7 days before placing grout.

C. Reinforce masonry unit cores and cavities with reinforcement bars and grout as indicated.

D. Retain vertical reinforcement in position at top and bottom of cells and at intervals not exceeding 192 bar diameters. Splice reinforcement in accordance with Section 03200.

E. Wet masonry unit surfaces in contact with grout just prior to grout placement.

F. Grout spaces less than 2 inches (50 mm) in width with fine grout using low lift grouting techniques. Grout spaces 2 inches (50 mm) or greater in width with course grout using high or low lift grouting techniques.

G. When grouting is stopped for more than one hour, terminate grout 1-1/2 inch (38 mm) below top of upper masonry unit to form a positive key for subsequent grout placement.

H. Low Lift Grouting: Place first lift of grout to a height of 16 inches (400 mm) and rod for grout consolidation. Place subsequent lifts in 8 inch (200 mm) increments and rod for grout consolidation.

I. High Lift Grouting:
   1. Provide cleanout opening no less than 4 inches (100 mm) high at the bottom of each cell to be grouted by cutting one face shell of masonry unit.
   2. In double wythe walls, omit every second masonry unit in one of the wythes for clean out and cell inspection purposes.
   3. In double wythe walls, construct vertical grout barriers or dams between the masonry wythes, with masonry units every 30 feet (10 m) maximum.
   4. Clean out masonry cells and cavities with high pressure water spray. Permit complete water drainage.
   5. Request inspection of the cells and cavities. Allow 3 days advance notice of inspection.
   6. After cleaning and cell inspection, seal openings with masonry units.

7. Pump grout into spaces. Maintain water content in grout to intended slump without aggregate segregation.
8. Limit grout lift to 60 inches (1 500 mm) and rod for grout consolidation. Wait 30 to 60 minutes before placing next lift.

3.15 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control and expansion joints.

B. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

C. Size control joint in accordance with Section 07900 for sealant performance.

D. Form expansion joint as detailed.

3.16 BUILT-IN WORK

A. As work progresses, install built-in fabricated metal frames, window frames, wood nailing strips, fireplace accessories, anchor bolts, plates and other items to be built-in the work.

B. Install built-in items plumb and level.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout. Fill adjacent masonry cores with grout minimum 12 inches (300 mm) from framed openings.

D. Do not build in organic materials subject to deterioration.

3.17 TOLERANCES

A. Maximum Variation From Alignment of Columns and Pilasters: 1/4 inch (6 mm).

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.

D. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).

F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft (3 mm/m).

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

3.18 CUTTING AND FITTING

A. Cut and fit for chases, pipes, conduit, sleeves and grounds. Coordinate with other sections of work to provide correct size, shape and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.19 PARGING

A. Dampen masonry walls prior to parging.

B. Scarify each parging coat to ensure full bond to subsequent coat.

C. Parge masonry walls in uniform coats to thickness specified on drawings.

D. Steel trowel surface smooth and flat with a maximum surface variation of 1/8 inch per foot (1mm/m).

E. Strike top edge of parging at 45 degrees.

3.20 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.

B. Inspect all masonry work.

C. Inspect engineered masonry work.

D. Inspect parging work.

3.21 CLEANING

A. Clean work under provisions of 01700.

B. Remove excess mortar and mortar smears as work progresses.

C. Replace defective mortar. Match adjacent work.

D. Clean soiled surfaces with cleaning solution.

E. Use non-metallic tools in cleaning operations.

3.22 PROTECTION OF FINISHED WORK

A. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END OF SECTION 04300

SECTION 05120 - STRUCTURAL STEEL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel framing members, support members, suspension cables, sag rods and struts.

B. Base plates, shear stud connectors and expansion joint plates.

C. Grouting under base plates.

1.02 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.03 NOT USED

1.04 REFERENCES

A. AISC-Code of Standard Practice-Manual of Steel Construction-Allowable Stress Design (ASD).
B. AISC - Section 10 - Architecturally Exposed Structural Steel.
C. ASTM A36/A36M - Structural Steel.
D. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
E. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.
F. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.
G. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.
H. ASTM A242/A242M - High-Strength Low-Alloy Structural Steel.
I. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.
J. ASTM A325 - High Strength Bolts for Structural Steel Joints.
K. ASTM A449 - Quenched and Tempered Steel Bolts and Studs.
L. ASTM A490 - Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.
M. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
N. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
O. ASTM A502 - Steel Structural Rivets.
P. ASTM A514/A514M - High-Yield Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding.
Q. ASTM A529/A529M - Structural Steel With 42 KSI (290 MPa) Minimum Yield Point (1/2 in. (12.7 mm) Maximum Thickness).
R. ASTM A563 - Carbon and Alloy Steel Nuts.
S. ASTM A568/A568M - General Requirements for Steel, Carbon and High-Strength Low-Alloy Hot-Rolled Sheet and Cold-Rolled Sheet.
T. ASTM A572/A572M - High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality.
U. AWS A2.4 - Symbols for Welding, Brazing, and Nondestructive Examination.
V. AWS D1.1 - Structural Welding Code.
W. TS-648 - Building Code for Steel Structures..
X. TS-2967 - Zinc Coatings, Steel/Aluminum.
Y. TS-416 - Welded Steel Pipes for General Purposes.

Z. TS-3057 - Forged Steel Bars.
AA. TS-2162 - Steels for General Structural Purposes.
AB. TS-69 - Bolts and Studs.
AC. TS-1909 - Steels for Rivets.
AD. TS-2837 - Steels for Bolts and Nuts.
AE. TS-7940 - Bolts, Screws, Studs, and Nuts, Designations, Types and Finishes.
AF. TS-3813 - Steel, Sheets and Strips, Cold Rolled.
AG. TS-2163 - Hot Rolled Steel Sheets and Plates.
AH. TS-10321 - Weldable Normalized Fine Grain Structural Steels.
AI. TS-7830 - Quality Assurance of Welding Operations.

1.05 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Shop Drawings:
1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments and fasteners.
2. Connections not detailed.
3. Cambers and loads.
4. Indicate welded connections with welding symbols. Indicate net weld lengths.

1.06 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Procedures for submittals.

B. Manufacturer's Mill Certificate: Certify that Products meet or exceed specified requirements.

C. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.

D. Welders Certificates: Certify welders employed on the Work, verifying qualification within the previous 12 months.

1.07 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with specifications.

B. Maintain one copy of each document on site.

C. Fabricator: Company specializing in performing the work of this section with minimum five years documented experience.

D. Erector: Company specializing in performing the work of this section with minimum five years documented experience.

E. Design connections not detailed on the Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work.

1.08 NOT USED

PART 2 PRODUCTS

2.01 MATERIALS

A. Structural Steel Members: As detailed on drawings.

B. Structural Tubing: As detailed on drawings.

C. Pipe: As specified on drawings.

D. Shear Stud Connectors: Forged steel, headed, unfinished.

E. Suspension Cable: Wire rope.

F. Sag Rods: As detailed on drawings.

G. Bolts, Nuts, and Washers: As specified on drawings.

H. Anchor Bolts: As detailed on drawings.

I. Rivets: High strength type carbon steel.

J. Welding Materials: Type required for materials being welded.

K. Sliding Bearing Plates: Teflon coated.

L. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi (48 MPa) at 28 days.

M. Shop and Touch-Up Primer: Red oxide.

2.02 FABRICATION

A. Space shear stud connectors as detailed on drawings.

B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

C. Fabricate connections for bolt, nut, and washer connectors or rivetting.

D. Develop required camber for members.

2.03 FINISH

A. Prepare structural component surfaces in accordance with specifications.

B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete or high strength bolted.

2.04 SOURCE QUALITY CONTROL AND TESTS

A. Provide shop testing and analysis of structural steel sections.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.02 ERECTION

A. Allow for erection loads and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection and installation of permanent bracing.

B. Field weld components indicated on Drawings and shop drawings.

C. Field connect members with threaded fasteners; torque to required resistance or rivets.

D. Do not field cut or alter structural members without approval of Contracting Officer.

E. After erection, prime welds, abrasions and surfaces not shop primed, except surfaces to be in contact with concrete.

F. Grout under base plates as detailed on drawings. Trowel grouted surface smooth, splay neatly to 45 degrees.

3.03 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

3.04 FIELD QUALITY CONTROL

A. Section 01400 - Quality Assurance: Field inspection, testing of bolt torquing, welds and torquing of fasteners.

END OF SECTION 05120

SECTION 05500 – METAL FABRICATIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated items.

B. Shop fabricated aluminum items.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete: Placement of metal fabrications in concrete.

B. Section 09900 - Painting: Paint finish.

1.03 NOT USED

1.04 REFERENCES

A. AAMA 603.8 - Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.
B. AAMA 605.2 - Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
C. AAMA 606.1 - Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
D. AAMA 607.1 - Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
E. AAMA 608.1 - Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum.
F. ANSI A14.3 - Ladders, Fixed, Safety Requirements.
G. ASTM A36 - Structural Steel.
H. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
I. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
J. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
K. ASTM A283 - Carbon Steel Plates, Shapes, and Bars.
L. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
M. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
N. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
O. ASTM B26 - Aluminum-Alloy Sand Castings.
P. ASTM B85 - Aluminum-Alloy Die Castings.
Q. ASTM B177 - Chromium Electroplating on Steel for Engineering Use.
R. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
S. ASTM B210 - Aluminum-Alloy Drawn Seamless Tubes.
T. ASTM B211 - Aluminum-Alloy Bar, Rod, and Wire.
U. ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
V. AWS A2.0 - Standard Welding Symbols.
W. AWS D1.1 - Structural Welding Code.

X. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
Y. TS-4317 - Drying, Curing or Film Formation of Organic Coatings,
Z. TS-1385 - Colored Anodization of Aluminum.
AA. TS-1293 - Anodization of Aluminum.
BB. TS-2850 - Case Hardened Steel
CC. TS-149 - Protective Coatings for Iron and Steel Parts.
DD. TS-5479 - Coatings for Hardware.
EE. TS-6936 - Corrugated Sheets-Aluminum Alloys.
FF. TS-2163 - Hot Rolled Steel Sheets.
GG. TS-3518 - Cold Rolled Steel Sheets.

1.05 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners and accessories. Include erection drawings, elevations and details where applicable.

C. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

1.06 QUALIFICATIONS

A. Prepare Shop Drawings under direct supervision of a Structural Engineer experienced in design of this work.

B. Welders Certificates: Submit under provisions of Section 01300, certifying welders employed on the Work, verifying qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: TS 2162.
B. Plates: TS 3813.
C. Pipe: Schedule 40
D. Steel Tubes: TS 346.
E. Fasteners: Galvanized.
F. Bolts, Nuts, and Washers: Galvanized.
G. Welding Materials: Type required for materials being welded.
H. Shop and Touch-Up Primer: Red oxide.
I. Touch-Up Primer for Galvanized Surfaces: Inorganic zinc rich.

2.02 NOT USED

2.03 FABRICATION

A. Fit and shop assemble items in largest practical sections for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by intermittent welds and plastic filler.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATION TOLERANCES

A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

2.05 FINISHES - STEEL

A. Clean surfaces of rust, scale, grease and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Prime paint items with one coat.

D. Structural Steel Members: Provide minimum 1.25 oz/sq ft (380 g/sq m) galvanized coating.

E. Non-structural Items: Provide minimum 2.0 oz/sq ft (360 g/sq m) galvanized coating.

2.06 NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on Drawings and shop drawings.

D. Perform field welding in accordance with AWS D1.1.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions and surfaces not shop primed, except surfaces to be in contact with concrete.

3.04 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION 05500

SECTION 05520 – HANDRAILS AND RAILINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Steel, Aluminum, pipe and tube handrails, balusters, and fittings.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete: Placement of anchors in concrete.

B. Section 04300 - Unit Masonry System.

C. Section 09900 - Painting: Paint finish.

1.03 REFERENCES

A. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
B. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
C. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
D. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
E. ASTM B211 - Aluminum-Alloy Bars, Rods, and Wire.
F. ASTM B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
G. ASTM B241 - Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.
H. ASTM B483 - Aluminum and Aluminum-Alloy Drawn Tubes For General Purpose Applications.
I. ASTM E935 - Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
J. ASTM E985 - Permanent Metal Railing Systems and Rails for Buildings.
K. TS-416 - Welded Steel Pipes for General Purposes.
L. TS-2967 - Zinc Coatings, Steel/Aluminum.
M. TS-346 - Steel Tubes for General Purposes.
N. TS-3187 - Tubes of Aluminum and Aluminum Alloys-Seamless Drawn.
O. TS-3188 - Tubes of Aluminum and Aluminum Alloys-Extruded.
P. TS-3962 - Aluminum Drawn Bars.
Q. TS-4924 - Aluminum-Extruded Sections.

1.04 DESIGN REQUIREMENTS

A. Fabricate railing assembly, wall rails and attachments to requirements.

1.05 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners and accessories.

C. Samples: Submit as specified in Section 01300, AF Form 66.

PART 2 PRODUCTS

2.01 NOT USED

2.02 NOT USED

2.03 STEEL RAILING SYSTEM

A. Rails and Posts: Steel tubing or pipe, welded or threaded joints as detailed on drawings.

B. Posts: Steel tubing or pipe, welded or threaded joints as detailed on drawings.

C. Fittings: Elbows, T-shapes, wall brackets, escutcheons; machined steel.

D. Mounting: Adjustable brackets and flanges, with steel inserts/brackets for casting in concrete or embedding in masonry. Prepare backing plate for mounting in wall construction.

E. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

F. Splice Connectors: Steel concealed spigots , welding collars or threaded collars.

G. Plastic handrail Cover: Extruded PVC, profile and color as selected.

H. Galvanizing: Provide minimum 1.25 oz/sq ft (380 g/sq m) galvanized coating.

2.04 FABRICATION

A. Fit and shop assemble components in largest practical sizes for delivery to site.

B. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

C. Provide anchors, plates and angles required for connecting railings to structure.

D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

F. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.

G. Interior Components: Continuously seal joined pieces by continuous welds.

H. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush and hairline. Ease exposed edges to small uniform radius.

I. Accurately form components to each other and to building structure.

J. Accommodate for expansion and contraction of members and building movement without damage to connections or members.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete and/or embedded in masonry, placed in partitions with setting templates to appropriate sections.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and as detailed on drawings.

B. Install components plumb and level, accurately fitted, free from distortion or defects.

C. Anchor railings to structure with anchors, plates or angles as detailed on drawings.

D. Field weld anchors as indicated on Drawings and shop drawings. Touch-up welds with primer. Grind welds smooth.

E. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

F. Assemble with spigots and sleeves to accommodate tight joints and secure installation.

3.04 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per storey, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION 05520

SECTION 07631 – GUTTERS AND DOWNSPOUTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Precoated, Galvanized steel, Aluminum, Stainless steel, Copper, Terne coated, PVC gutters and downspouts.

B. Precast concrete splash pads or sheet metal splash pads.

1.02 RELATED SECTIONS

A. Section 09900 - Painting: Field painting of metal surfaces.

1.03 REFERENCES

A. TS-3131 - High Temperature Steel Sheets-Chromium-Nickel..
B. TS-822 - Galvanized Steel Sheet.
C. TS-677 - Soft Solders
D. TS-709 - Strips and Plates of Aluminum and Aluminum Alloys
E. TS-554 - Copper Sheets and Strips.
F. TS-306 - Asphalt for Damp-Proofing and Water-Proofing.
G. TS-3288 - Rules for Marking Suspended Metal Round Roof Gutters, Round Downspouts and Accessories.
H. ASTM A167 - Stainless and Heat-Resisting, Chromium-Nickel Steel Plate.
I. ASTM A446 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
J. ASTM B32 - Solder Metal.
K. ASTM B209 - Aluminum and Aluminum Alloy Sheet and Plate.
L. ASTM B370 - Copper Sheet and Strip for Building Construction.
M. ASTM B486 - Paste Solder.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

C. Product Data: Provide data on prefabricated components.

D. Samples: Submit two samples, sufficient illustrating component design, finish, color, and configuration.

1.05 NOT USED

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for size and method of rain water discharge.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.

C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

1.08 COORDINATION

A. Coordinate the work with downspout discharge pipe inlet.

PART 2 PRODUCTS

2.01 NOT USED

2.02 MATERIALS

A. Pre-Coated Galvanized Steel: Grade A, G90 zinc coating; gage (0.6 mm) core steel, shop pre-coated with modified silicone color as selected or to match with the existing.

B. Galvanized Steel: G90 zinc coating; 24 or 26 gage (0.6or 0.5 mm) core steel.

C. Stainless Steel: Type 304, soft temper, thickness, pattern and finish as indicated on drawings.

D. Polyvinyl Chloride (PVC): Virgin vinyl, high impact type, color fast or color as selected.

2.03 COMPONENTS

A. Gutters: Rectangular or square or semi-circular style profile or as indicated on drawings.

B. Downspouts: Rectangular or square or round profile or as indicated on drawings.

C. Accessories: Profiled to suit gutters and downspouts.

D. Splash Pans: Same metal type as downspouts, as indicated on drawings.

E. Splash Pads or Blocks: Precast concrete type, of sizes and profiles indicated; minimum 3000 psi (21 Mpa) at 28 days, with minimum 5 percent air entrainment.

F. Downspout Boots and Shoes: Steel or Plastic.

2.04 ACCESSORIES

A. Anchorage Devices: Type recommended by fabricator.

B. Gutter Supports: Brackets or straps or as indicated on drawings.

C. Downspout Supports: Brackets or Straps.

D. Fasteners: Galvanized steel or aluminum or stainless steel or copper, with soft neoprene washers. Finish exposed fasteners same as flashing metal.

E. Primer: Zinc chromate or galvanized iron or iron oxide linseed oil.

F. Protective Backing Paint: Zinc chromate alkyd or iron oxide linseed oil paint.

G. Solder: 50/50 type.

H. Soldering:

A. Other Than Aluminum: All edges of uncoated sheet metal to be soldered shall be pre-tinned before soldering is began. Soldering shall be done slowly with well-heated soldering irons so as to through heat the seam and completely sweat the solder through the full width of the seams. Ample solder shall be used and the seam shall show not less than 25 mm of evenly flowed solder. For all materials, soldering shall follow immediately after application of the flux. Upon completion of soldering, acid shall be neutralized and surfaces shall be thoroughly cleaned (TS 677).

2.05 FABRICATION

A. Form gutters and downspouts of profiles and sizes indicated.

B. Fabricate with required connection pieces.

C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.

D. Hem exposed edges of metal.

E. Pretin edges of copper other metal sheets. Solder shop formed metal joints. After soldering, remove flux. Wipe and wash solder joints clean. Weather seal joints.

F. Fabricate gutter and downspout accessories; solder or seal watertight.

2.06 FINISHES

A. Prepare copper or other metal surfaces in accordance with Section 09900.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

3.02 INSTALLATION

A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.

B. Join lengths with formed, seams, sealed or soldered watertight. Flash and seal or solder gutters to downspouts and accessories.

C. Slope gutters 1/4 inch per foot (20 mm/m) minimum.

D. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

E. Connect downspouts to downspout boots or downspout shoes and storm sewer system. Grout or Seal connection watertight.

F. Set splash pans or pads or blocks under downspouts. Place where indicated.

END OF SECTION 07631

SECTION 07900 – JOINT SEALERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preparing substrate surfaces.

B. Sealant and joint backing.

1.02 RELATED SECTIONS

A. Section 08800 - Glazing: Glazing sealants and accessories.

1.03 REFERENCES

A. TS-3153 - Specification-Rubber Latex, Natural, Centrifuged or Creamed
B. TS-5892 - Jointing Products-Sealants.
C. TS-3444 - Flexible Cellular Materials-Latex Foam Rubbers.
D. TS-10734 - Polymeric Materials-Cellular Flexible.
E. ASTM C790 - Use of Latex Sealing Compounds.
F. ASTM C804 - Use of Solvent-Release Type Sealants.
G. ASTM C834 - Latex Sealing Compounds.
H. ASTM C919 - Use of Sealants in Acoustical Applications.
I. ASTM C920 - Elastomeric Joint Sealants.
J. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
K. ASTM D1565 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations and color availability.

C. Samples: Submit two samples, 2 inch (10x50 mm) in size illustrating sealant colors for selection.

D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform acoustical sealant application work in accordance with specifications.

1.06 QUALIFICATIONS

A. NOT USED

B. Applicator: Company specializing in performing the work of this section with minimum three years documented experience.

1.07 MOCKUP

A. Provide mockup to include sealant joints in conjunction with window, wall, air barrier system, and pavements under provisions of Section 01400.

B. Construct mockup with specified sealant types and with other components noted.

C. Locate where directed.

D. Mockup may remain as part of the Work.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.09 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.10 NOT USED

PART 2 PRODUCTS

2.01 SEALANTS

A. Polysulfide Sealant (Type A): Two component polysulfide, CEKO THIOMASTIC T-12 by CUHADAROGLU or equal. PRIMERS by CUHADAROGLU or equal.

B. Polyurethane Sealant (Type B): Single component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging self-leveling type; color as selected.

C. Silicone Sealant (Type C): Shall be CEKO THIOMASTIC, series 600 MASTICS manufactured by CUHADAROGLU or equal.

2.02 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: round, closed polyethylene foam rod; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions.

D. Protect elements surrounding the work of this section from damage or disfiguration.

3.03 INSTALLATION

A. Install sealant in accordance with manufacturer's instructions.

B. Measure joint dimensions and size materials to achieve width/depth ratios.

C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Tool joints concave or as detailed.

3.04 CLEANING

A. Clean work under provisions of 01700.

B. Clean adjacent soiled surfaces.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished installation under provisions of Section 01500.

B. Protect sealants until cured.

3.06 SCHEDULE (SAMPLE)

Location		Type	Color
A.	Window perimeter	B	Dark Brown
B.	Metal Roofing and Siding	C	To match siding
C.	Bathtub/Ceramic	C	White Tile
D.	Paving Joints	A	Black

END OF SECTION 07900

SECTI0N 08114 – CUSTOM STEEL DOORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Non-rated, fire rated, thermally insulated and acoustic steel doors and panels.

B. Louvers, Glass and glazing.

1.02 RELATED SECTIONS

A. Section 08115 - Custom Steel Frames.

B. Section 09900 - Painting: Field painting of doors.

1.03 REFERENCES

A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
B. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
C. ASTM A525M - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process [Metric].
D. ASTM A591/A591M - Steel Sheet, Electrolytic Zinc-Coated, For Light Coating Class Applications.
E. ASTM C236 - Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot-Box.
F. ASTM E152 - Methods of Fire Tests of Door Assemblies.
G. ASTM E413 - Classification for Determination of Sound Transmission Class.
H. DHI (Door Hardware Institute) - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
I. NFPA 80 - Fire Doors and Windows.
J. NFPA 252 - Fire Tests for Door Assemblies.
K. UL 10B - Fire Tests of Door Assemblies.
L. TS-822 - Steel Sheets, Hot-Dipped Galvanized.
M. TS-914 - Galvanizing.
N. TS-7748 - Fire Resistance Tests of Elements of Building Construction.
O. TS-2673 - Acoustics-Guide to the Measurement of Accoustical Noise and Evaluation.
P. TS-9935 - Fire Protection of Buildings.
Q. TS-7396 - FireTests-Evaluation of Performance of Smoke Control Doors.

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Indicate door configurations, location of cut-outs for hardware reinforcement.

C. Shop Drawings: Indicate door elevations, internal reinforcement, closure method and cut-outs for glazing, louvers and finishes.

D. Samples: Submit as specified in Section 01300, AF Form 66.

1.05 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Procedures for submittals.

B. Manufacturer's Installation Instructions: Indicate special installation instructions.

C. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.07 REGULATORY REQUIREMENTS

A. Fire Rated Door and Panel Construction: As specified on drawings.

1.08 DELIVERY, STORAGE AND PROTECTION

A. Section 01600 - Material and Equipment: Transport, handle, store and protect products.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Break seal on site to permit ventilation.

1.09 PROJECT CONDITIONS

A. Coordinate the work with door opening construction, door frame and door hardware installation.

B. Sequence installation to ensure wire connections are achieved in an orderly and expeditious manner.

PART 2 PRODUCTS

2.01 NOT USED

2.02 DOORS AND PANELS

A. Exterior Doors: As specified and detailed on drawings.

B. Interior Doors: As specified and detailed on drawings.

2.03 DOOR AND PANEL CONSTRUCTION

A. Face: Steel, galvanized sheet, electrolytic zinc-coated, unless noted otherwise on drawings.

B. Core: Impregnated honeycomb, foam, mineral blocking or vertical steel stiffeners as detailed on drawings.

C. Door Edge Design: As specified and detailed on drawings.

D. Thermal Insulated Door: Total insulation R value as specified on drawings.

E. Sound Rated Door: STC as specified on drawings.

2.04 ACCESSORIES

A. Louvers: As specified and detailed on drawings.

B. Removable Stops: Rolled steel channel shape, butted or mitered corners; prepared for countersink style tamper proof screws, unless noted otherwise on drawings.

C. Primer: Zinc chromate type.

2.05 FABRICATION

A. Astragals for Double Doors: Steel or Aluminum, Z or T shaped, recessed at face edge or at mid-door thickness as detailed on drawings, specifically for double doors.

B. Fabricate doors with hardware reinforcement welded in place.

C. Fabricate fire doors as detailed on drawings. Attach fire rated label to each fire rated door unit.

D. Configure exterior doors with special profile to receive recessed weather stripping.

2.06 FINISH

A. Exterior Units: As specified on drawings.

B. Interior Units: As specified on drawings.

C. Primer: Air-dried.

D. Factory Finish: Baked enamel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 INSTALLATION

A. Install doors in accordance with drawings.

B. Coordinate installation of glass and glazing.

C. Install door louvers, plumb and level.

D. Coordinate installation of doors with installation of frames and hardware.

E. Touch-up factory finished doors.

3.03 ERECTION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch (1.5 mm) measured with straight edge, corner to corner.

3.04 ADJUSTING

A. Section 01700 - Contract Closeout, Section 01650 - Starting of Systems: Adjusting installed work.

B. Adjust door for smooth and balanced door movement.

END OF SECTION 08114

SECTION 08115 – CUSTOM STEEL FRAMES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Non-rated, fire rated and thermally insulated steel frames.

B. Interior glazed light frames.

1.02 RELATED SECTIONS

A. Section 08114 - Custom Steel Doors.

1.03 REFERENCES

A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
B. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
C. ASTM A525M - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process [Metric].
D. ASTM A591/A591M - Steel Sheet, Electrolytic Zinc-Coated, For Light Coating Class Applications.
E. ASTM E152 - Methods of Fire Tests of Door Assemblies.
F. NFPA 80 - Fire Doors and Windows.
G. NFPA 252 - Fire Tests for Door Assemblies.
H. UL 10B - Fire Tests of Door Assemblies.
I. TS-8983 - Obligatory Safety Measures in Structures.
J. TS-822 - Steel Sheets, Hot-Dipped Galvanized.
K. TS-914 - Galvanizing.
L. TS-7748 - Fire Resistance Tests of Elements of Building Construction.
M. TS-9935 - Fire Protection of Buildings.

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Indicate frame configuration and finishes.

C. Shop Drawings: Indicate frame elevations, reinforcement, anchor types and spacings, location of cut-outs for hardware and finish.

D. Samples: Submit as specified in Section 01300, AF Form 66.

1.05 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Procedures for submittals.

B. Manufacturer's Installation Instructions: Indicate special installation instructions.

C. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.07 REGULATORY REQUIREMENTS

A. Fire Rated Frame Construction: As specified and detailed on drawings.

B. Installed Frame Assembly: Fire rated class same as fire door.

1.08 DELIVERY, STORAGE AND PROTECTION

A. Section 01600 - Material and Equipment: Transport, handle, store and protect products.

B. Accept frames on site in manufacturer's packaging. Inspect for damage.

C. Break seal on-site to permit ventilation.

1.09 PROJECT CONDITIONS

A. Coordinate the work with frame opening construction, door and hardware installation.

B. Sequence installation to ensure wire connections are achieved in an orderly and expeditious manner.

PART 2 PRODUCTS

2.01 NOT USED

2.02 FRAMES

A. Steel: Galvanized sheet, electrolytic zinc-coated, unless specified otherwise on drawings.

B. Exterior Frames: 0.058 inch (1.5 mm) thick material, base metal thickness, unless specified otherwise on drawings.

C. Interior Frames: 0.058 inch (1.5 mm) thick material, base metal thickness, unless specified otherwise on drawings.

2.03 ACCESSORIES

A. Silencers: Resilient rubber set in steel channel, fitted into drilled hole, unless detailed otherwise on drawings.

B. Removable Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamper proof screws, unless noted otherwise on drawings.

C. Bituminous Coating: Fibered asphalt emulsion, unless specified otherwise on drawings.

D. Primer: Zinc chromate type.

E. Weatherstripping: Resilient rubber set in steel or aluminum frame, unless specified otherwise on drawings.

2.04 FABRICATION

A. Fabricate frames for knock down field assembly.

B. Mullions for Double Doors: Fixed or Removable type as detailed on drawings, of same profiles as jambs.

C. Transom Bars for Glazed Lights: Fixed type, of same profiles as jamb and head.

D. Fabricate frames with hardware reinforcement plates welded in place. Provide mortar guard boxes.

E. Fabricate frames for fire rated openings. Attach fire rated label to each frame.

F. Reinforce frames wider than 48 inches (1 200 mm) with roll formed steel channels fitted tightly into frame head, flush with top.

G. Terminate door stops 6 inches (150 mm) above finished floor, unless noted otherwise on drawings. Cut stop at 90 degree angle and close.

H. Prepare frames for silencers. Provide three single silencers for single doors and mullions of double doors on strike side, unless specified otherwise on drawings. Provide two single silencers on frame head at double doors without mullions, unless specified otherwise on drawings.

I. Configure exterior frames with special profile to receive recessed weatherstripping.

J. Fabricate frames to suit masonry wall coursing.

2.05 FINISH

A. Exterior and Interior Units: As specified on drawings.

B. Primer: Air dried.

C. Factory Finish: Baked enamel.

D. Coat inside of frame profile with bituminous coating to a thickness of 1/16 inch (1.50 mm).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 INSTALLATION

A. Install frames and hardware as detailed on drawings.

B. Coordinate with masonry, gypsum board or concrete wall construction for anchor placement.

C. Coordinate installation of glass and glazing.

D. Coordinate installation of frames with installation of hardware and doors.

E. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.

F. Touch-up factory finished frames.

3.03 ERECTION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch (1.5 mm) measured with straight edges, crossed corner to corner.

END OF SECTION 08115

SECTION 09210 – GYPSUM PLASTER

PART 1 - GENERAL

1.01 SECTION INCLUDES
- A. Hardwall or Light weight aggregate plaster system.
- B. Gypsum lath.
- C. Access panels.
- D. Plaster fireproofing for building structural members.
- E. Plaster base for gypsum veneer plaster.

1.02 RELATED SECTIONS
- A. Section 09220 - Portland Cement Plaster.
- B. Section 09260 - Gypsum Board Systems: Metal studs for partitioning.

1.03 REFERENCES
- A. ASTM C28 - Standard Specification for Gypsum Plasters.
- B. ASTM C35 - Standard Specification for Inorganic Aggregates for Use in Gypsum Plaster.
- C. ASTM C37 - Standard Specification for Gypsum Lath.
- D. ASTM C61 - Standard Specification for Gypsum Keene's Cement.
- E. ASTM C206 - Standard Specification for Finishing Hydrated Lime.
- F. ASTM C631 - Standard Specification for Bonding Compounds for Interior Plastering.
- G. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- H. ASTM C842 - Standard Specification for Application of Interior Gypsum Plaster.
- I. ASTM C844 - Standard Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster.
- J. ASTM C847 - Standard Specification for Metal Lath.
- K. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
- L. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- M. TS-6917 - Gypsum Rock for Plaster Production.
- N. TS-370 - Gypsum Plasters.
- O. TS-1262 - Internal Plastering.
- P. UL - Fire Resistance Directory.
- Q. TS-4022 - Hyudrated Lime for Use in Building.
- R. TS-5266 - Gypsum Plasters-General Test Conditions.
- S. TS-3541 - Application of Mineral Fiber Insulating Materials.
- T. TS-7748 - Fire Resistance Tests of Elements of Building Construction.
- U. TS-2673 - Accoustics-Guide to the Measurement of Accoustical Noise and Evaluation.

1.04 SYSTEM DESCRIPTION
- A. Acoustic Attenuation for Identified Interior Partitions: STC in accordance with specified requirements.
- B. Fabricate vertical elements to limit finish surface to 1:240 or 1:360 deflection under lateral point load of 100 lbs (445 N).
- C. Fabricate horizontal elements to limit finish surface to 1:240 or 1:360 deflection under superimposed dead load and wind uplift loads.

1.05 SUBMITTALS FOR REVIEW
- A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide data on plaster materials, characteristics, and limitations of products specified.

1.06 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work of this section with minimum 3 years experience or approved by manufacturer.

1.07 NOT USED

1.08 MOCK-UP
A. Section 01400 - Quality Control: Requirements for mock-up.
B. Provide mock-up of interior wall and ceiling system.
C. Construct mock-up, sufficient in size illustrating surface finish.
D. Locate where directed.
E. Mock-up may remain as part of the Work.

1.09 ENVIRONMENTAL REQUIREMENTS
A. Section 01600 - Material and Equipment: Environmental conditions affecting products on site.
B. Do not apply plaster when substrate or ambient air temperature is less than 50 degrees F (10 degrees C) nor more than 80 degrees F (27 degrees C).
C. Maintain minimum ambient temperature of 50 degrees F (10 degrees C) during and after installation of plaster.

PART 2 PRODUCTS

2.01 PLASTER BASE MATERIALS
A. Plaster: Gypsum neat hardwall type, fibrated or unfibrated.
1. Plaster: Gypsum mill aggregated type.
2. Plaster: Gypsum wood fiber type.
3. Plaster: Gypsum bonding type.
B. Lightweight Aggregate: Sand and vermiculite or perlite.
C. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.
D. Bonding Agent: Type recommended for bonding plaster to concrete and concrete block surfaces.

2.02 FINISHING PLASTER
A. Gypsum/Lime Putty Type: Mixture of gaging plaster and lime.
1. Keene's Cement/Lime Putty Type: Mixture of Keene's cement and lime.
2. Sand Float Type: Prepared mixture of gypsum plaster and sand.
3. Sand Float Type: Prepared mixture of Keene's cement/lime putty and sand.
B. Water: Clean, fresh, potable and free of mineral and organic matter which can affect plaster.

2.03 GYPSUM LATH
A. Gypsum Lath: Standard or insulating type; 3/8 or 1/2 inch (10 or 13 mm) thick or thickness indicated.

2.04 METAL LATH
A. Metal Lath and Accessories.

2.05 ACCESSORIES
A. Casing Bead: Formed sheet steel or zinc or PVC, depth governed by plaster thickness, maximum possible lengths, expanded metal or solid flanges, with square edges; galvanized or rust inhibitive primer.
B. Corner Bead: Formed sheet steel or zinc or PVC, depth governed by plaster thickness, maximum possible lengths, expanded metal or solid flanges with radiused edge; galvanized or rust inhibitive primer.
C. Base Screed: Formed sheet steel or zinc or PVC, depth governed by plaster thickness, maximum possible lengths, expanded metal or solid flanges, with beveled edge; galvanized or rust inhibitive primer.
D. Corner Mesh: Formed sheet steel, minimum 0.018 inch (0.5 mm) thick, perforated or expanded flanges shaped to permit complete embedding in plaster, minimum 2 inch (50 mm) size; galvanized or rust inhibitive primer.

E. Strip Mesh: Expanded metal lath, minimum 0.018 inch (0.5 mm) thick, 2 inch (50 mm) wide x 24 inch (600 mm) long; galvanized or rust inhibitive primer.
F. Control and Expansion Joint Accessories: Formed sheet steel or zinc or PVC, accordion profile, 2 inch (50 mm) expanded metal or solid flanges each side, galvanized or rust inhibitive primer.
G. Anchorage: Nails, staples, or other approved metal supports, of type and size to suit application, to rigidly secure lath and associated metal accessories in place.
H. Fasteners: Self drilling, self tapping screws.
I. Access Panels, Non-Fire Rated In Plaster on Metal Furring: Formed stainless steel.
J. Access Panels, Fire Rated In Plaster on Metal Furring: Formed stainless steel, 1 hour fire rating.

2.06 ACOUSTIC ACCESSORIES
A. Resilient Furring Channels: Formed steel, minimum 0.020 inch (0.5 mm) thick; serrated face, flattened Z profile, splicing permitted; galvanized or rust inhibitive primer.
B. Acoustic Insulation: Friction fit type, unfaced.
C. Acoustic Sealant: Non-hardening, non-skinning type, for use in conjunction with gypsum plaster system.

2.07 PLASTER MIX
A. Mix and proportion plaster in accordance with specifications manufacturer's instructions.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify existing conditions before starting work.
B. Masonry: Verify joints are cut flush and surface is ready to receive work of this section. Verify no bituminous or water repellent coatings exist on masonry surface.
C. Concrete: Verify surfaces are flat, honeycomb is filled flush, and surface is ready to receive work of this section. Verify no bituminous, water repellent, or form release agents exist on concrete surface that are detrimental to plaster or plaster bond.
D. Grounds and Blocking: Verify items within walls for other sections of work have been installed.
E. Gypsum Lath and Accessories: Verify substrate is flat and surface is ready to receive work of this section. Verify joint and surface perimeter accessories are in place.
1. Metal Lath and Accessories: Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are in place.
F. Mechanical and Electrical: Verify services within walls have been tested and approved.

3.02 PREPARATION
A. Dampen masonry surfaces to reduce excessive suction.
B. Clean concrete surfaces of foreign matter. Thoroughly dampen surfaces before using acid solutions, solvent, or detergents to perform cleaning. Wash surface with clean water.
C. Roughen smooth concrete surfaces and smooth faced masonry.
D. Apply bonding agent in accordance with manufacturer's instructions.

3.03 INSTALLATION - LATH MATERIALS
A. Install gypsum lath in accordance with specified requirements.
B. Install gypsum lath perpendicular to framing members, with lath face exposed. Stagger end joint of alternate courses. Butt joints tight. Maximum gap allowed: 1/8 inch (3 mm).
C. Place corner reinforcement diagonally over gypsum lath and across corner immediately above and below openings. Secure to gypsum lath only.
D. Install lath and accessories.
E. Lap ends minimum 1 (25 mm). Secure end laps with tie wire where they occur between supports.
F. Lap sides of diamond mesh lath minimum 1-1/2 inches (38 mm). Nest outside ribs of rib lath together.
G. Attach metal lath to wood supports using nails at maximum 10 inches (250 mm) on center.

H. Attach metal lath to metal supports using tie wire at maximum 6 inches (150 mm) on center.
I. Attach metal lath to concrete or concrete masonry using wire hair pins or hooks, or loops. Ensure that anchors are securely attached to concrete and spaced at maximum 24 inches (600 mm) on center.

3.04 INSTALLATION - ACCESSORIES
A. Continuously reinforce internal angles with corner mesh, return metal lath 3 inches (75 mm) from corner to form the angle reinforcement; fasten at perimeter edges only.
B. Place corner bead at external wall corners; fasten at outer edges of lath only.
C. Place strip mesh diagonally at corners of lathed openings. Secure rigidly in place.
D. Place 4 inch (100 mm) wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.
E. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.
F. Install door and glazed frames plumb and level in opening. Secure rigidly in place.
G. Install metal access panels and rigidly secure in place.
H. Position to provide convenient access to concealed work requiring access.

3.05 INSTALLATION - ACOUSTIC ACCESSORIES
A. Install resilient furring channels 24 inches (600 mm) on center at right angles to framing members. Place end joints over framing members. Terminate channels 10 inches (250 mm) short of door frames and perimeter construction.
B. Fit acoustic insulation tightly between partition framing members to fill space. Pack insulation around mechanical, electrical, or other components in partition.
C. Place acoustic sealant at gypsum backing board lath partition perimeter in accordance with manufacturer's instructions. Seal penetrations of conduit, pipe, duct work, rough-in boxes, and other components.

3.06 CONTROL AND EXPANSION JOINTS
A. Locate control and expansion joints every 20 feet (6 m) or as indicated.
B. Use preformed device to form joint.
C. Coordinate joint placement with other related work.

3.07 PLASTERING
A. Apply gypsum plaster in accordance with specifications or manufacturer's instructions.
B. Apply brown and finish coats over gypsum lath or masonry or concrete or clay tile surfaces. Apply brown coat to a nominal thickness of 3/8 inch (9 mm).
C. Apply color tinted bond coat to prepared surfaces within 2 hours of plaster application. Apply in accordance with manufacturer's instructions.
D. Apply finish coat to minimum 1/8 inch (3 mm) thickness.
E. Work the finish coat flat and smooth, with steel trowel.
F. Perform work in panels to nearest natural break or between accessories.

3.08 ERECTION TOLERANCES
A. Maximum Variation from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m).

3.09 SCHEDULES SAMPLE
A. All Offices: Two coat gypsum plaster over gypsum board lath, smooth finish.
B. Entry Area: Three coat gypsum plaster over metal lath, coarse float finish.
C. Elevator Hoistway Walls: Three coat lightweight plaster over metal lath, smooth finish where exposed, 2 hour fire rated.

END OF SECTION 09210

SECTION 09220 – PORTLAND CEMENT PLASTER

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Portland cement plaster system.
- B. Metal furring and lathing.
- C. Smooth Raked Sprayed Struck or Special rendered surface finish.
- D. Access panels.

1.02 RELATED SECTIONS
- A. Section 09210 - Gypsum Plaster.
- B. Section 09260 - Gypsum Board Systems.

1.03 REFERENCES
- A. ASTM C91 - Standard Specification for Masonry Cement.
- B. ASTM C150 - Standard Specification for Portland Cement.
- C. ASTM C206 - Standard Specification for Finishing Hydrated Lime.
- D. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
- E. ASTM C631 - Standard Specification for Bonding Compounds for Interior Plastering.
- F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- G. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters.
- H. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster.
- I. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- J. TS-19 - Portland Cement.
- K. TS-33-Sand
- L. TS-370 - Gypsum Plasters.
- M. TS-1262 - Internal Plasters.
- N. TS-1481-External Plastering
- O. TS-2848 - Mortar for Masonry
- P. TS-4022 - Hydrated Lime-For Use in Building.
- R. TS-3541 - Mineral-Fiber Insulating Materials.
- S. TS-2717 - Aggregate for Masonary Motar.

1.04 SYSTEM DESCRIPTION
- A. Fabricate vertical elements to limit finish surface to 1:240 deflection under lateral point load of 100 lbs (445 N).
- B. Fabricate horizontal elements to limit finish surface to 1:300 deflection under superimposed dead load and wind uplift loads.

1.05 SUBMITTALS FOR REVIEW
- A. Section 01300 - Submittals: Procedures for submittals.
- B. Product Data: Provide data on plaster materials, characteristics and limitations of products specified.
- C. Samples: Submit two samples, sufficient in size illustrating finish color and texture.

1.06 QUALITY ASSURANCE
- A. Applicator Qualifications: Company specializing in performing the work of this section with minimum 3 years experience approved by manufacturer.

1.07 NOT USED

1.08 MOCK-UP
- A. Section 01400 - Quality Control: Requirements for mock-up.
- B. Provide mock-up of exterior and interior wall and ceiling system.
- C. Construct mock-up, 8 feet (2.40 m) long by 75 inch (19 mm) wide, illustrating surface finish.
- D. Locate where directed.
- E. Mock-up may remain as part of the Work.

1.09 ENVIRONMENTAL REQUIREMENTS
- A. Section 01600 - Material and Equipment: Environmental conditions affecting products on site.
- B. Do not apply plaster when substrate or ambient air temperature is less than 50 degrees F (10 degrees C) nor more than 80 degrees F (27 degrees C).
- C. Maintain minimum ambient temperature of 50 degrees F (10 degrees C) during installation of plaster and until cured.

PART 2 PRODUCTS

2.01 PLASTER BASE MATERIALS
- A. Base Coat: Portland cement plaster shall be a mixture of Portland cement, send and lime. Cement plaster mix proportions shall be as indicated in paragraph 2.6 here.
- B. Lime: Shall conform to TS 4022.
- C. Aggregate: Natural sand, conforming TS 33.
- D. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.
- E. Bonding Agent: type recommended for bonding plaster to concrete and concrete masonry surfaces.
- F. Admixtures: Air entrainment
- G. Plaster Mix Reinforcement: Purpose made glass fibers, chopped to 1/2 inch (13 mm) nominal length, alkali resistant.

2.02 PLASTER FINISH MATERIALS
- A. Cement: As specified for plaster base coat, white or gray color.
- B. Lime: As specified for plaster base coat.
- C. Color Pigment: Mineral oxide or Synthetic type color as indicated.
- D. Water: Clean, fresh, potable, and free of matter which can affect plaster.

2.03 FINISH AGGREGATE
- A. Mineral Aggregate: colored limestone, marble or granite.
- B. Glass Aggregate: NOT USED

2.04 FURRING AND LATHING
- A. Metal Lath: Flat diamond self furring mesh, flat rib, 3/8 inch (10 mm) high, rod ribbed, 3/4 inch (19 mm) high stamped sheet; 2.5 lb/sq ft (11 kg/sq m) of weight to suit application, backed with treated foil paper; galvanized or rust inhibitive primer.
- B. Wire Mesh Reinforcement: 2 x 2 inch (50 x 50 mm) galvanized steel 24 gage (0.6 mm) wire, woven mesh, self-furring type.
- C. Underlayment: Asphalt saturated felt.
- D. Casing Bead: Formed sheet steel zinc or PVC, depth governed by plaster thickness, maximum possible lengths, expanded metal, solid flanges, with square or beveled edges; galvanized or rust inhibitive primer.
- E. Corner Bead: Formed sheet steel or PVC, depth governed by plaster thickness, maximum possible lengths, expanded metal solid flanges with radiused edge; galvanized or rust inhibitive primer.
- F. Base Screed: Formed sheet steel or PVC, depth governed by plaster thickness, maximum possible lengths, expanded metal solid flanges, with beveled edge; galvanized or rust inhibitive primer.

G. Corner Mesh: Formed sheet steel, minimum 0.018 inch (0.5 mm) thick, perforated or expanded flanges shaped to permit complete embedding in plaster, minimum 2 inch (50 mm) size; galvanized or rust inhibitive primer.
H. Strip Mesh: Expanded metal lath, minimum 0.018 inch (0.5 mm) thick, 2 inch (50 mm) wide x 24 inch (600 mm) long; galvanized or rust inhibitive primer.
I. Control and Expansion Joint Accessories: Formed sheet steel or PVC, accordion profile, 2 inch (50 mm) expanded metal or solid flanges each side, galvanized or rust inhibitive primer.
J. Anchorage: Tie wire, nails, and other metal supports, of type and size to suit application; to rigidly secure materials in place, galvanized.
K. Fasteners: Self drilling, self tapping screws.
L. Polyethylene Sheet: Clear, 6 mil (0.15 mm) thick.
M. Access Panels, Non-Fire Rated In Plaster on Metal Furring: Formed primed steel or galvanized steel shop primed.
N. Access Panels, Fire Rated In Plaster on Metal Furring: Formed primed steel or galvanized steel or stainless steel with brushed finish, shop primed, 1 hour fire rating.

2.05 ACOUSTIC ACCESSORIES
A. Resilient Channels: Formed steel, minimum 0.020 inch (0.5 mm) thick; serrated face, flattened Z hat shaped profile, splicing permitted; galvanized or rust inhibitive primer.
B. Acoustic Insulation: friction fit type, unfaced.
C. Acoustic Sealant: Non-hardening, non-skinning type, for use with cement plaster system.

2.06 CEMENT PLASTER MIXES
A. Mix and proportion cement plaster in accordance with manufacturer's instructions or as indicated.
B. Base Coat and Brown Coat: One part cement, minimum 3-1/2 and maximum 4 parts aggregate, and minimum 15 percent and maximum 25 percent hydrated lime.
C. Finish Coat: One part cement, 4 parts aggregate, 14 part lime.
D. Mix only as much plaster as can be used prior to initial set.
E. Add color pigments to finish coat in accordance with manufacturer's instructions.
F. Mix materials dry, to uniform color and consistency, before adding water.
G. Add air entrainment admixtures to finish coat to provide 5-7 percent entrainment in coat.
H. Protect mixtures from freezing, frost, contamination, and excessive evaporation.
I. Do not retemper mixes after initial set has occurred.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify existing conditions before starting work.
B. Masonry: Verify joints are cut flush and surface is ready to receive work of this section. Verify no bituminous or water repellent coatings exist on masonry surface.
C. Concrete: Verify surfaces are flat, honeycomb are filled flush, and surfaces are ready to receive work of this section. Verify no bituminous, water repellent, or form release agents exist on concrete surface that are detrimental to plaster bond.
D. Metal Lath and Accessories: Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are in place.
E. Mechanical and Electrical: Verify services within walls have been tested and approved.

3.02 PREPARATION
A. Dampen masonry surfaces to reduce excessive suction.
B. Clean concrete surfaces of foreign matter. Clean surfaces using acid solutions, solvents, or detergents. Wash surfaces with clean water.
C. Roughen smooth concrete surfaces and apply bonding agent in accordance with manufacturer's instructions.

3.03 INSTALLATION - LATHING MATERIALS

A. Apply one ply of felt underlayment over substrate; weather lap edges 4 inches (100 mm) minimum. Fasten in place.
B. Apply metal lath taut, with long dimension perpendicular to supports.
C. Lap ends minimum 1 inch (25 mm). Secure end laps with tie wire where they occur between supports.
D. Lap sides of diamond mesh lath minimum 1-1/2 inches (38 mm). Nest outside ribs of rib lath together.
E. Attach metal lath to concrete or concrete masonry using wire, hair pins, hooks, or loops. Ensure that anchors are securely attached to concrete and spaced at maximum 24 inches (600 mm) on center.

3.04 INSTALLATION - ACCESSORIES

A. Continuously reinforce internal angles with corner mesh, return metal lath 3 inches (75 mm) from corner to form the angle reinforcement; fasten at perimeter edges only.
B. Place corner bead at external wall corners; fasten at outer edges of lath only.
C. Place strip mesh diagonally at corners of lathed openings. Secure rigidly in place.
D. Place 4 inch (100 mm) wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.
E. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.
F. Install door and glazed frames plumb and level in opening. Secure rigidly in place.
G. Install metal access panels and rigidly secure in place.
H. Position to provide convenient access to concealed work requiring access.

3.05 CONTROL AND EXPANSION JOINTS

A. Locate interior control and expansion joints every 20 feet (6 m) or as indicated.
B. After initial set, scribe contraction joints in exterior work every 3 feet (1 m) in each direction or as indicated by cutting through 2/3 of the cement plaster depth, neatly, in straight lines.
C. Locate exterior control and expansion joints every 12 feet (3.5 m) in each direction or as indicated on reflected ceiling plan.
D. Establish control and expansion joints with double casing beads butted tight or back to back casing beads, set 1/4 inch (6 mm) apart. Set both beads over 6 inch (150 mm) wide strip of polyethylene sheet for air seal continuity.
E. Coordinate joint placement with other related work.

3.06 PLASTERING

A. Apply plaster in accordance with manufacturer's instructions.
B. Apply brown coat to a nominal thickness of 3/4 inch (18 mm) and a finish coat to a nominal thickness of 1/4 inch (6 mm) over masonry, concrete, clay tile and other surfaces.
C. Apply base coat to a nominal thickness of 3/4 inch (18 mm), brown coat to a nominal thickness of 3/4 inch (18 mm), and a finish coat to a nominal thickness of 1/4 inch (6 mm) over metal lath and self-furring reinforcement.
D. Moist cure base and brown coats. Apply brown coat immediately following initial set of scratch coat.
E. After curing, dampen previous coat prior to applying finish coat.
F. Apply finish coat and wood float, steel trowel, rake, struck and spray to a consistent and smooth finish.
G. Avoid excessive working of surface. Delay troweling as long as possible to avoid drawing excess fines to surface.
H. Hand or Machine apply aggregate surfacing to full surface coverage.
I. Moist cure finish coat for minimum period of 48 hours.

3.07 ERECTION TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m).

END OF SECTION 09220

SECTION 09900 - PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation and field application of paints and coatings.

1.02 NOT USED

1.03 REFERENCES

A. TS-39-Ready Mixed Oil Paints
B. TS-53 - Wood- Sampling and Test Methods.
C. TS-144 - Liquid Dryers
D. TS-772-White Pigments for Paints
E. TS-789-Enamel Gloss
F. TS-2436-Mineral Solvents for Paints
G. TS-2620-Paints and Varnishes, Determination of Thickness
H. TS-4319 - Protective and Decorative Paints-Terms and Definitions.
I. TS-5808 - Water-Based (Emulsion Type) Architectural Paints.
J. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
K. ASTM D2016 - Test Method for Moisture Content of Wood.
L. AWWA (American Water Works Association) - C204 - Chlorinated Rubber-Alkyd Paint Systems for the Exterior of Above Ground Steel Water Piping.

1.04 NOT USED

1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data on all finishing products and special coating.

C. Samples: Submit two samples, sufficient in size illustrating range of colors and textures available for each surface finishing product scheduled.

D. Samples: Submit two samples, sufficient in size illustrating selected colors and textures for each color selected.

E. Manufacturer's Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention.

F. Certificates of Compliance: The Contractor shall furnish a certificate of compliance in accordance with the Section 01300 and paragraph 1.07- B "Hazardous Materials Restrictions".

G. Test Reports: The Contractor shall furnish either one (1) of the following reports for batches in excess of 40 liters.

1. A test report showing that the batch meets all specification requirements.
2. A test report showing that a previous batch of the same formulation as the batch to be used met all specification requirements, and a report of test results for properties of weight per liter, viscosity, fineness of grind, drying time, color, and gloss.

1.06 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum 3 years experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable NFPA 255 code for flame and smoke rating requirements for finishes.

B. Hazardous Materials Restrictions:
1. Lead: Certificates of compliance shall be furnished attesting that each type of paints proposed for use does not contain more than 0.06 percent lead. A list shall be provided which itemizes each chemical compound and percentages thereof for each type of paint proposed to be used.
2. Mercury: Mercurial fungicides shall not be used in oil-based paints. If a mercurial fungicide is used in water-thinned paints, the maximum percent of mercury (calculated as metal) shall not exceed 0.2.

1.08 FIELD SAMPLES

A. Provide field sample of paint under provisions of Section 01400.

B. Provide field sample panel, sufficient in size, illustrating special coating color, texture, and finish.

C. Locate where directed.

D. Accepted sample may remain as part of the Work.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

C. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

D. Store paint materials at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

1.11 EXTRA MATERIALS

A. Provide 1 gallons (4 L) of each color, type, and surface texture to Owner.

B. Label each container with color, type, texture, room locations, in addition to the manufacturer's label.

PART 2 PRODUCTS

2.01 NOT USED

2.02 MATERIALS

A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.

B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

C. Patching Materials: Latex or filler.

D. Fastener Head Cover Materials: Latex or filler.

2.03 FINISHES

A. Refer to schedule at end of section for surface finish [and color] schedule.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify site conditions prior to starting work.

B. Verify that surfaces or substrate conditions are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. Test shop applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Plaster and Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   3. Interior Wood: 15 percent.
   4. Exterior Wood: 15 percent.
   5. Concrete Floors: 8 percent.

3.02 PREPARATION

A. Hardware, hardware accessories, mechanical surfaces, plates, lighting fixtures or fire detection elements and similar items in place prior to cleaning and painting which are not intended to be painted shall be removed, masked or otherwise protected prior to painting operations. Radiators and other equipment adjacent to walls shall be disconnected by workmen skilled in these trades and moved to permit the wall surface to be painted and shall be replaced and connected after completion of painting.

B. Correct defects and clean surfaces which affect work of this section. Remove existing coatings that exhibit loose surface defects.

C. Seal with shellac and seal marks which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

F. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply latex based or compatible sealer or primer.

G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.

H. Concrete Floors: Remove contamination, acid etch and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

I. Copper Surfaces Scheduled for a Paint Finish: Remove contamination by steam, high pressure water, or solvent washing. Apply vinyl etch primer immediately following cleaning.

J. Copper Surfaces Scheduled for a Natural Oxidized Finish: Remove contamination by applying oxidizing solution of copper acetate and ammonium chloride in acetic acid. Rub on repeatedly for required effect. Once attained, rinse surfaces with clear water and allow to dry.

K. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.

L. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

M. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

N. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

O. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.

P. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.

Q. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.

R. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.

S. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied.

T. Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied.

U. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.

V. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish.

D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Sand, wood and metal lightly between coats to achieve required finish.

F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

G. Allow applied coat to dry before next coat is applied.

H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

I. Prime concealed surfaces of interior and exterior woodwork with primer paint.

J. Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to Section 15190 and Section 16195 for schedule of color coding and identification banding of equipment, duct work, piping, and conduit.

B. Paint shop primed equipment or shop prefinished items occurring at interior and exterior areas.

C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished.

E. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

F. Paint exposed conduit and electrical equipment occurring in finished areas.

G. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

H. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated. Color band and identify with flow arrows, names and numbering.

I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.05 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.

3.06 CLEANING

A. Clean work under provisions of 01700.

B. Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

END OF SECTION 09900

SECTION 16060 – MINOR ELECTRICAL DEMOLITION FOR REMODELING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical demolition.

1.02 RELATED SECTIONS

A. Section 01120 - Alteration Project Procedures.

B. Section 02072 - Minor Demolition for Remodeling.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify field measurements and circuiting arrangements are as shown on Drawings.

B. Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Contracting Officer before disturbing existing installation.

D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

B. Coordinate utility service outages with Contracting Officer.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from

Contracting Officer at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Contracting Officer and local fire service at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

F. Existing Telephone/Communication System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Contracting Officer and Base Communications at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Demolish and extend existing electrical work under provisions of Section 01120, Section 02072, and this Section.

B. Remove, relocate, and extend existing installations to accommodate new construction.

C. Remove abandoned wiring to source of supply.

D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.

F. Disconnect and remove abandoned panelboards and distribution equipment.

G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

J. Repair adjacent construction and finishes damaged during demolition and extension work.

K. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

L. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.04 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment which remain or are to be reused.

B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

C. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps [, ballasts,] and broken electrical parts.

3.05 INSTALLATION

A. Install relocated materials and equipment under the provisions of Section 01120.

END OF SECTION 16060

SECTION 16111 - CONDUIT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal conduit.
B. Flexible metal conduit.
C. Liquidtight flexible metal conduit.
D. Nonmetal conduit
E. Fittings and conduit bodies.

1.02 NOT USED

1.03 REFERENCES

A. TS-9 - Rigid Steel Conduit, Zinc Coated.
B. TS-2169 - Underground Steel Pipes, Corrosion Protection Rules.
C. TS-2172 - Rigid PVC Conduits
D. TS-40 - Outlets & Fittings
E. TS-3066 - Fittings, Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
F. ANSI/NEMA FB 1 - Fitings, Cast Metal Boxes and Conduit Bodies for Conduit and Cables.
G. NFPA 70 - National Electrical Code.

1.04 DESIGN REQUIREMENTS

A. Conduit Size: NFPA 70.

1.05 SUBMITTALS

A. Submit under provisions of Section 01300 Submittals and AF Form 66.

B. Product Data: Provide for metallic conduit, flexible metal conduit, liquidtight flexible metal conduit , nonmetallic conduit , fittings , and conduit bodies.

1.06 PROJECT RECORD DOCUMENTS

A. Accurately record actual routing of conduits larger than 2 inches (51 mm).

1.07 REGULATORY REQUIREMENTS

A. Furnish products listed and classified testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.08 NOT USED

1.09 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle Products to site under provisions of Section 01600 - Material and Equipment.

B. Accept conduit on site. Inspect for damage.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

D. Protect PVC conduit from sunlight.

1.10 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 PRODUCTS

2.01 CONDUIT REQUIREMENTS

A. Minimum Size: 3/4 inch (19 mm) unless otherwise specified.

B. Underground Installations:
1. More than Five Feet from Foundation Wall:
Use rigid steel conduit.
2. Within Five Feet from Foundation Wall: Use rigid steel conduit.
3. In or Under Slab on Grade: Use rigid steel conduit, thickwall nonmetallic conduit
4. Minimum Size: 3/4 inch (19 mm).

C. Outdoor Locations, Above Grade: Use rigid conduit.

D. In Slab Above Grade:
1. Use rigid steel conduit or thickwall nonmetallic conduit.

E. Wet and Damp Locations: Use rigid steel conduit or thickwall nonmetallic conduit.

F. Dry Locations:
1. Concealed: Use rigid conduit.
2. Exposed: Use rigid conduit.

2.02 METAL CONDUIT

A. Rigid Steel Conduit

B. Fittings and Conduit Bodies: Material to match conduit.

2.03 NOT USED

2.04 FLEXIBLE METAL CONDUIT

A. Description: Interlocked steel construction.

B. Fittings: Material to match conduit.

2.05 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Description: Interlocked steel construction with PVC jacket.

B. Fittings: Material to match conduit

2.06 NOT USED

2.07 NONMETALLIC CONDUIT

A. Description: Hard PVC.

B. Fittings and Conduit Bodies: Material to match conduit.

2.08 NOT USED

PART 3 EXECUTION

3.01 INSTALLATION

A. Install conduit in accordance with NEC and details on drawings.

B. Install nonmetallic conduit in accordance with manufacturer's instructions.

C. Arrange supports to prevent misalignment during wiring installation.

D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers and split hangers.

E. Group related conduits; support using conduit rack. Construct rack using steel channel ; provide space on each for 25 percent additional conduits.

F. Fasten conduit supports to building structure and surfaces under provisions of Section 16190.

G. Do not support conduit with wire or perforated pipe straps. Remove wire, cable-ties, string and etc. used for temporary supports

H. Do not attach conduit to ceiling support wires.

I. Arrange conduit to maintain headroom and present neat appearance.

J. Route exposed conduit parallel and perpendicular to walls.

K. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

L. Route conduit in and under slab from point-to-point.

M. Maintain adequate clearance between conduit and piping.

N. Maintain 12 inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).

O. Cut conduit square using saw or pipecutter; de-burr cut ends.

P. Bring conduit to shoulder of fittings; fasten securely.

Q. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

R. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

S. There shall be no more than the equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate bends in metal conduit larger than 2 inch (50 mm) size.

T. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

U. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control and expansion joints.

V. Provide suitable pull string in each empty conduit except sleeves and nipples.

W. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

X. Ground and bond conduit under provisions of Section 16170.

Y. Identify conduit under provisions of Section 16195.

3.02 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Section 07270.

B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket.

END OF SECTION 16111

SECTION 16123 - BUILDING WIRE AND CABLE 600 VOLTS OR LESS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building wire and cable.
B. Nonmetallic-sheathed cable.
C. Direct Burial Cable
D. Service entrance cable.
E. Armored cable.
F. Metal clad cable.
G. Wiring connectors and connections.

1.02 RELATED SECTIONS

A. Section 02225 - Trenching: Trenching and backfilling for Direct Burial Cable Installation.

B. Section 16111 - Conduit.

1.03 REFERENCES

A. NFPA 70 - National Electrical Code
B. TS-621 - Cables (General Principles)
C. TS-37 - Testing Methods for Cables
D. TS-684 - Impulse Voltage Tests for Cables and Cable Accessories
E. TS-212 - Insulated Y-Cables up to and Including 10kv

1.04 SUBMITTALS

A. Product Data: Provide for each cable assembly type.

B. Test Reports: Indicate procedures and values obtained.

C. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors.

1.05 NOT USED

1.06 REGULATORY REQUIREMENTS

A. Furnish products listed and classified by testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.07 NOT USED

1.08 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Conductor sizes are based on copper wire.

C. Wire and cable routing shown on Drawings is approximate. Route wire and cable as required to meet Project Conditions.

D. Where wire and cable routing is not shown, and destination only is indicated, field determine exact routing.

1.09 COORDINATION

A. Determine required separation between cable and other work.

B. Determine cable routing to avoid interference with other work.

PART 2 PRODUCTS

2.01 NOT USED

2.02 BUILDING WIRE AND CABLE

A. Description: Single or multi-conductor insulated wire as indicated on drawings.

B. Conductor: Copper

C. Insulation Voltage Rating: 600 volts.

2.03 NOT USED

2.04 NONMETALLIC-SHEATHED CABLE

A. Description: Type NYM, NYA

B. Conductor: Copper

C. Insulation Voltage Rating: 600 volts.

2.05 NOT USED

2.06 DIRECT BURIAL CABLE

A. Description: Type NYY, NYCY, XLPE.

B. Conductor: Copper

C. Insulation Voltage Rating: 600 volts.

D. Insulation Temperature Rating: 70 degrees C for NYY, NYCY, 90 degrees C for XLPE.

E. Underground Warning Tape: 4-inch (100mm) wide plastic tape, colored yellow with suitable warning legend describing buried electrical lines.

2.07 NOT USED

2.08 SERVICE ENTRANCE CABLE

A. Description: Type XLPE

B. Conductor: Copper

C. Insulation Voltage Rating: 600 volts.

D. Insulation: Type Cross Linked polyethylene

2.09 NOT USED

2.10 NOT USED

2.11 NOT USED

2.12 NOT USED

2.13 WIRING CONNECTORS

A. Split Bolt Connectors

B. Solderless Pressure Connectors

C. Spring Wire Connectors

D. Compression Connectors

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that mechanical work likely to damage wire and cable has been completed.

C. Verify that raceway installation is complete and supported

3.02 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.03 WIRING METHODS

A. Concealed Dry Interior Locations: Use only building wire, Type NYA insulation, in conduit.

B. Exposed Dry Interior Locations: Use only building wire, Type NYA insulation, in conduit.

C. Above Accessible Ceilings: Use only building wire, Type NYA in conduit.

D. Wet or Damp Interior Locations: Use only building wire, Type NYA insulation, in conduit.

E. Exterior Locations: Use only building wire, Type NYA insulation, in conduit.

F. Underground Installations: Use only NYY, NYCY or XLPE Type insulation.

G. NOT USED.

H. Use wiring methods indicated on Drawings.

3.04 INSTALLATION

A. Install products in accordance with specifications.

B. Use solid conductor for feeders and branch circuits 4 mm^2 and smaller.

C. Use stranded conductors for control circuits.

D. Use conductor not smaller than 4 mm^2 for power and 2.5 mm^2 for lighting circuits.

E. Use conductor not smaller than 1.5 mm^2 for control circuits.

F. Use 6 mm2 conductors for 20 ampere, 220 volt branch circuits longer than 23 m.

G. Pull all conductors into raceway at same time.

H. Use suitable wire pulling lubricant for all sizes of building wire.

I. Protect exposed cable from damage.

J. Support cables above accessible ceiling, using spring metal clips or metal or plastic cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.

K. Use suitable cable fittings and connectors.

L. Neatly train and lace wiring inside boxes, equipment, and panelboards.

M. Clean conductor surfaces before installing lugs and connectors.

N. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

O. Trench and backfill for direct burial cable installation. Install warning tape along entire length of direct burial cable, within 6 inches (150 mm) of grade.

P. Identify and color code wire and cable. Identify each conductor with its circuit number or other designation indicated.

Q. Use split bolt connectors for copper conductor splices and taps, 16 mm2 and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

R. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 10 mm^2 and smaller.

S. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 6 mm2 and smaller.

3.05 INTERFACE WITH OTHER PRODUCTS

A. Identify wire and cable.

B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.06 FIELD QUALITY CONTROL

A. Perform field inspection and testing as specified in scope of work.

B. Inspect wire and cable for physical damage and proper connection.

C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.

D. Verify continuity of each branch circuit conductor.

END OF SECTION 16123

SECTION 16180 – EQUIPMENT WIRING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical connections to equipment.

1.02 RELATED SECTIONS

A. Section 16111 - Conduit.

B. Section 16123 - Building Wire and Cable.

1.03 REFERENCES

A. Section 01400 - Quality Control and Section 01090 - Reference Standards: Requirements for references and standards.

B. NEMA WD 1 - General Purpose Wiring Devices.

C. NEMA WD 6 - Wiring Devices - Dimensional Requirements.

D. NFPA 70 - National Electrical Code.

E. TS-3203 - Electrical Installations of Buildings.

F. TS-10486 - Connecting Devices, Low Voltage Circuits.

G. TS-Plugs, Sockets/Outlets, General.

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide wiring device manufacturer’s catalog information showing dimensions, configurations, and construction.

1.05 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Submittals for information.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.06 REGULATORY REQUIREMENTS

A. Conform to specified requirements.

B. Products: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.07 COORDINATION

A. Obtain and review shop drawings, product data, manufacturer’s wiring diagrams and manufacturer's instructions for equipment furnished under other sections.

B. Determine connection locations and requirements.

C. Sequence rough-in of electrical connections to coordinate with installation of equipment.

D. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 PRODUCTS

2.01 CORDS AND CAPS

A. Attachment Plug Construction: Conform to specifications and drawing requirements.

B. Configuration: Match receptacle configuration at outlet provided for equipment.

C. Cord Construction: Multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.

D. Size: Suitable for connected load of equipment, length of cord and rating of branch circuit overcurrent protection.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

B. Verify that equipment is ready for electrical connection, wiring and energization.

3.02 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquid tight flexible conduit with watertight connectors in damp or wet locations.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Provide receptacle outlet to accommodate connection with attachment plug.

E. Provide cord and cap where field-supplied attachment plug is required.

F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

G. Install disconnect switches, controllers, control stations and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

J. Coolers and Freezers: Cut and seal conduit openings in freezer and cooler walls, floor and ceilings.

END OF SECTION 16180